VOLUME 13 NUMBER 4

THE AMERICAN BLACKSMITH

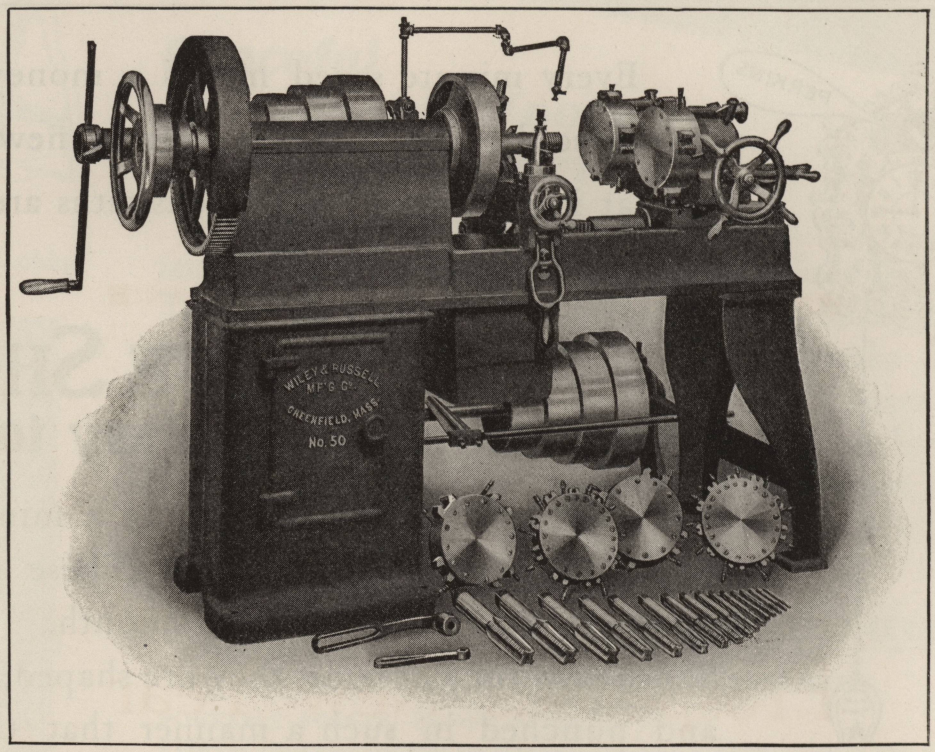
A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A.

JANUARY, 1914

$1.00 A YEAR
10c A COPY

Put In a Power Threader



"Green River" Bolt Cutter

(Improved No. 50)

With Automatic Opening Dies. Capacity: ¼" to 2" Threads

for

Bolts, Screws, Nuts, Pipe.

A Muscle Saver:

Cuts threads by the mile and never gets tired.

A Money Saver:

Works so much faster than your hands can, that the thread only costs a fraction of hand-made threads.

A Time Saver:

You never keep your customer waiting. The job is all done in a jiffy.

Write for Descriptive Circular and Prices.

WILEY & RUSSELL MFG. CO.

Greenfield, Mass.

NEW YORK CHICAGO PHILADELPHIA

WHY

THERE'S A G ON EVERY

GENUINE GIANT GRIP

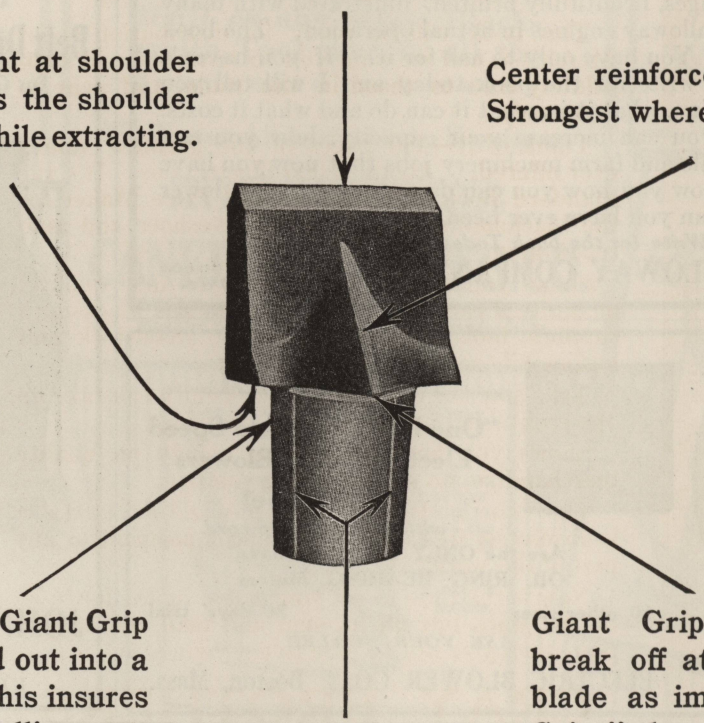
Giant Grip Calks are Drop Forged, not pressed as are imitation "Giant Grips."

Every Calk is Tempered to the correct degree of hardness by our secret process.

Giant Grip Calks will wear sharper than imitation "Giant Grips."

Heavy reinforcement at shoulder of all calks prevents the shoulder from breaking off while extracting.

Center reinforced back portion—Strongest where strength counts.



The shank of a Giant Grip Calk is well filled out into a Perfect Taper—this insures the calk from falling out.

Giant Grip Calks never break off at base of the blade as imitation "Giant Grips" do. : : : :

The Ribs on shank prevent calk from turning.

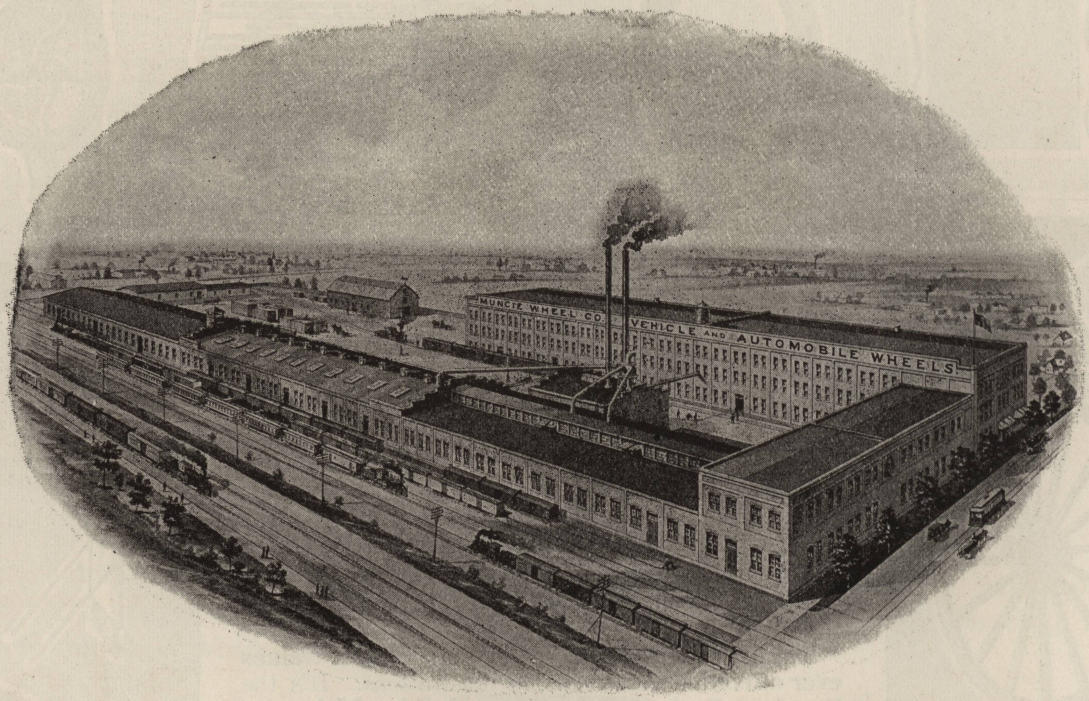
Giant Grip Calks are made of all tool steel (to our special analysis).

Giant Grip Calks are made in the same factory as are our shoes. This insures the calks fitting properly in the shoes and staying there.

Send for a Horseshoers' Price List, a Cloth Poster for Your Shop, and Horseowners' Circulars for Your Trade

GIANT GRIP HORSE SHOE CO.,

OSHKOSH, WISCONSIN



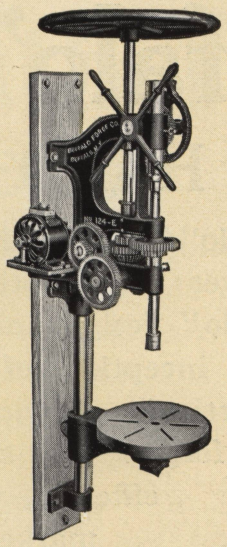
Mr. Blacksmith

If you want to buy really high-grade wheels and good service, you can get them from this factory.

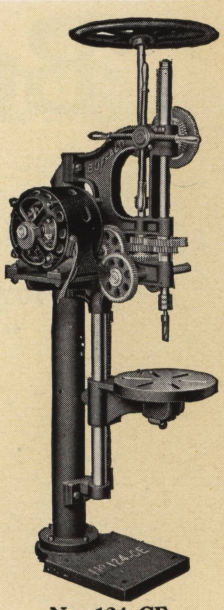
It is the best equipped wheel factory in existence. Send for our new list, No. 51, and when you want to order send us the order.

Our copyrighted booklet, ***"Knowledge Is Power,"*** will interest you, and we will mail copy on request.

Muncie Wheel Co. Muncie, Ind.



No. 124-E



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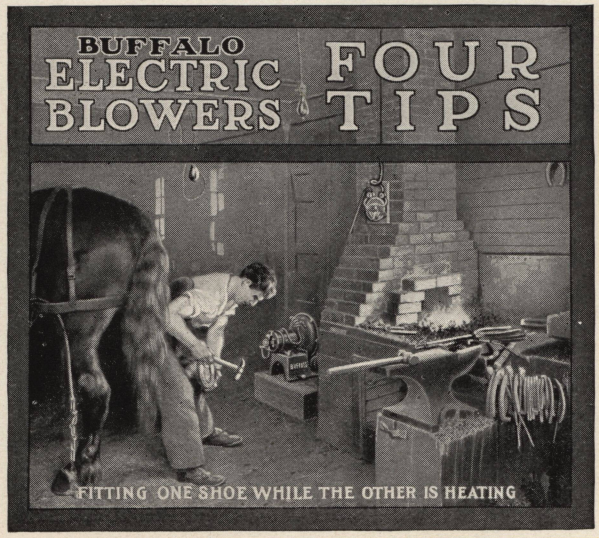

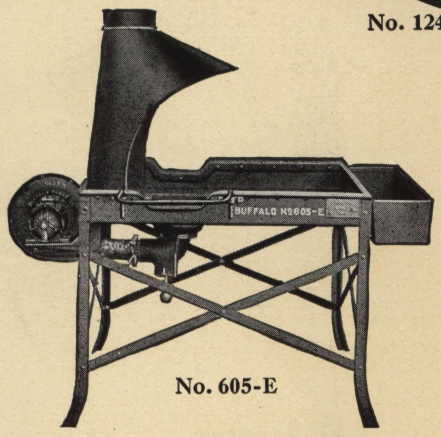

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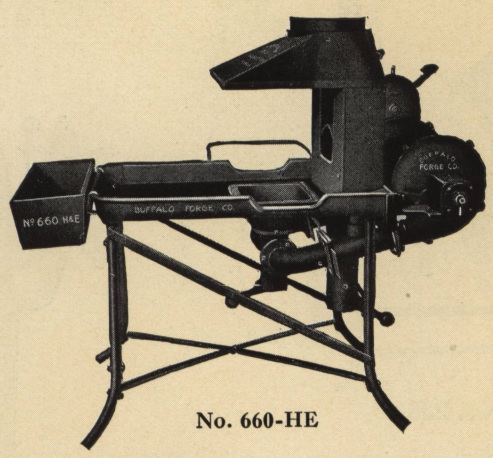


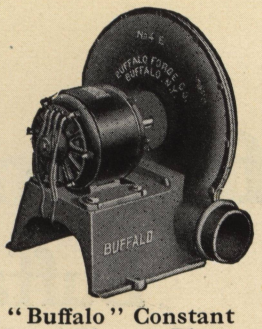
No. 660-HE

"Buffalo"

The name that stands for the best in design, material and construction, and which signifies leadership for thirty-five years. The first and only mechanically successful 14 and 16″ Hand Blowers to run no harder than the ordinary 12″ size; the largest electric blower giving the greatest blast at the lowest speed and cost; the original down draft forge—both portable and stationary types; ball bearing drills; armor plate punches and shears, and the largest line of steel and cast-iron forges to select from. Our Service and Suggestion Department will assist you to select your new equipment. Give us a chance to show you, and "Do it now."

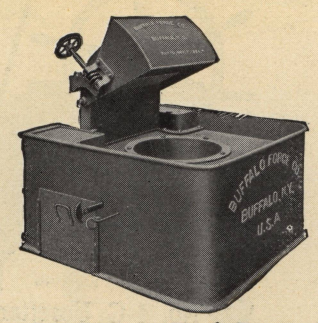
Buffalo Forge Company

Buffalo, N. Y., U. S. A.

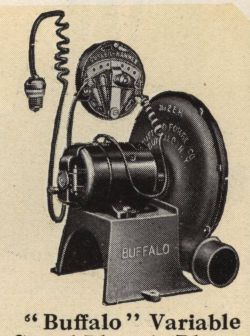


"Buffalo" Constant Speed Electric Blower

Blast Gate



O D B Down Draft Forge



"Buffalo" Variable Speed Electric Blower

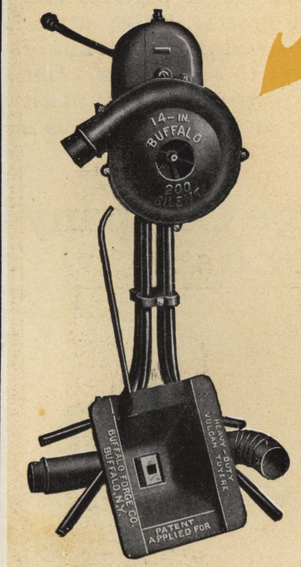
"Buffalo" Blacksmith Tools

HAND—POWER—ELECTRIC

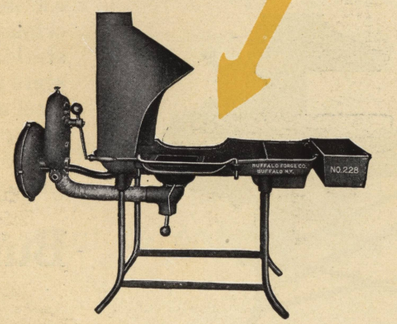
All "Buffalo" Tools combine strength, capacity, small floor space requirements, low power consumption and flexibility to the greatest possible extent. "Buffalo" design and construction are leaders today and have been since inception of the business. Each tool is the best for its particular service. Electrically operated blowers, drills and forges. All sizes for all classes of work. The only efficient, variable speed electric motor on the market. Do your work the modern way. Electricity costs less and is always on the job.

No. 6
Punch-Shear-Bar Cutter

No. 604



No. 200 Hand Blower



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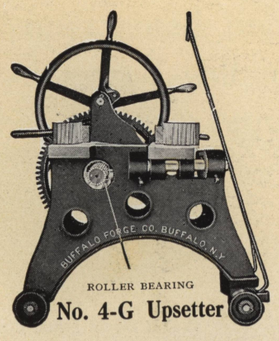
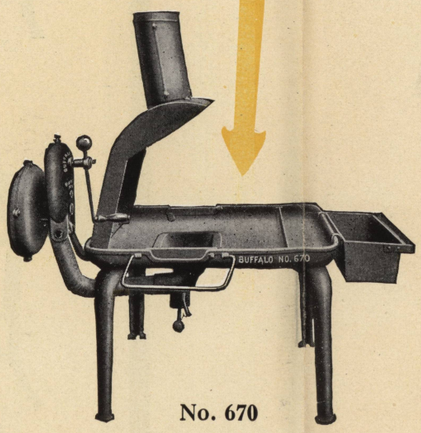


No. 4-G Upsetter



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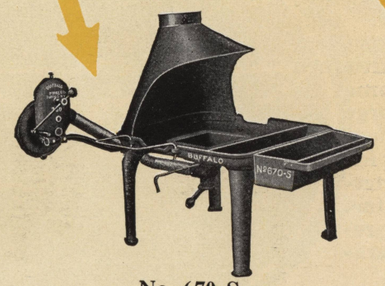

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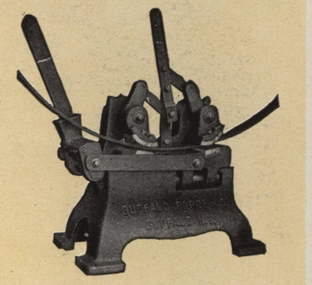
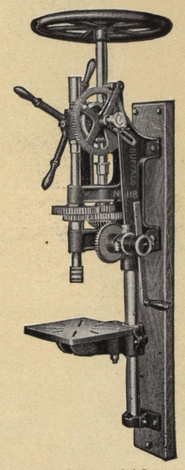


"Banner" Upsetter

No. 650



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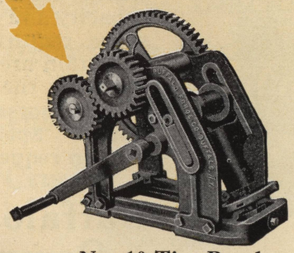
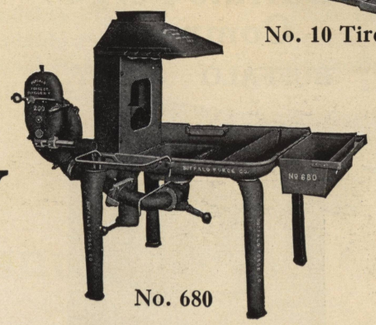


No. 10 Tire Bender



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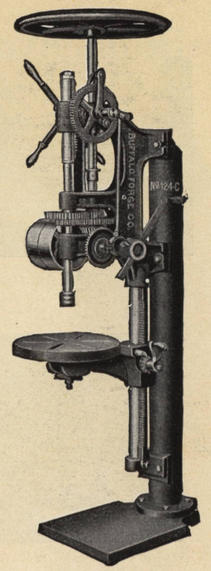
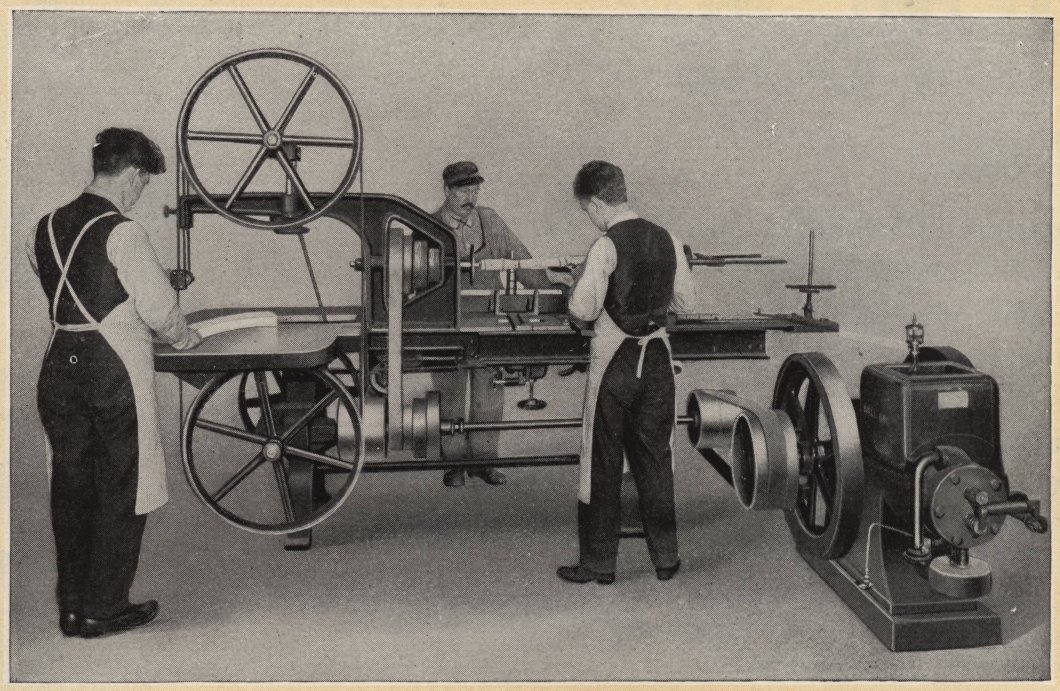
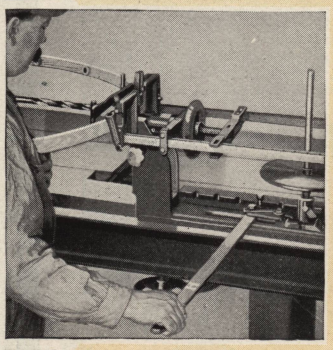


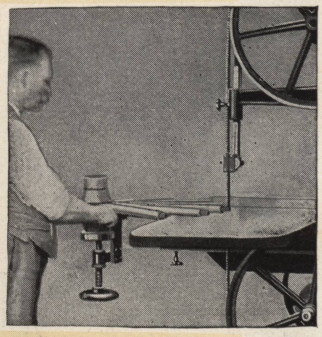
No. 124-C

Buffalo Forge Company

Buffalo, N. Y., U. S. A.





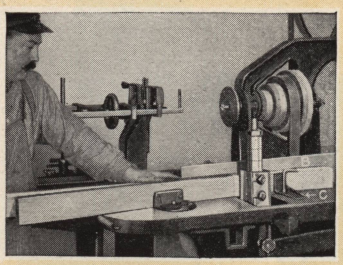


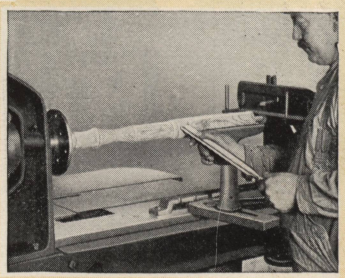
"BUFFALO" COMBINATION WOODWORKER

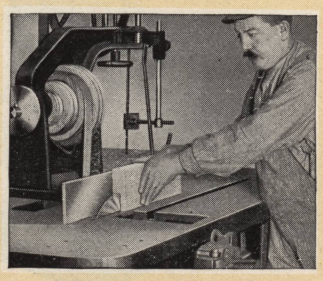
Combines twelve machines in one: Band saw, rip saw, cross-cut saw, planer, jointer, shaper, edge moulder, lathe, drill, borer, tenoner, spoke equalizer. Three men can work at the same time. Strength, large capacity and small floor space required for installation are characteristics of the machine. Only 4 horsepower required. Special literature on request.

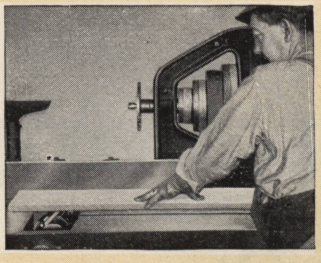
Buffalo Forge Company

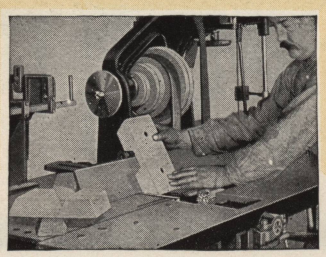
BUFFALO - N. Y.





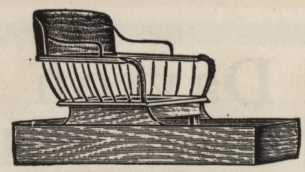






No. 244. BODY AND SEATS

Price, no Seats.....$5.75 and up
Price, with Seats..... 6.75 and up

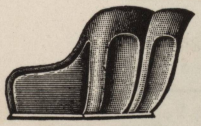


STICK SEAT BODY

$3.85 and up

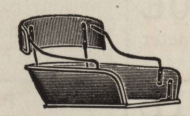
PIANO BODY

With Seat.....$1.60 and up
Without Seat..... .90 and up



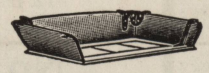
AUTO SEAT

Untrimmed...$2.65 and up
Trimmed.... 7.85 and up



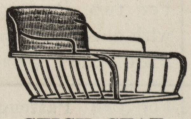
BENT PANEL SEAT

Untrimmed...$2.90 and up
Trimmed..... 5.90 and up



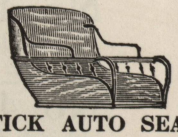
PANEL SEAT

Untrimmed...$ .65 and up
Trimmed.... 3.85 and up



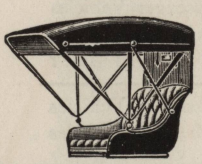
STICK SEAT

Untrimmed...$2.75 and up
Trimmed..... 6.05 and up



STICK AUTO SEAT

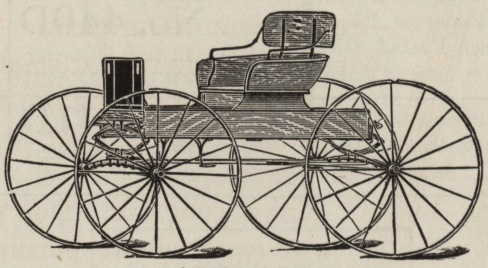
Untrimmed...$1.65 and up
Trimmed..... 5.65 and up



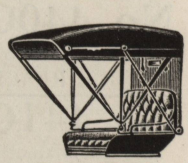
AUTO SEATS—TOP SETS

Seat.....$3.25 and up
Cushion and Back..... 3.85 and up
Top..... 7.95 and up

$15.05



$17.30 to $27.10



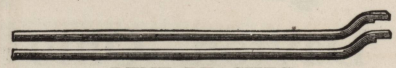
TOP SETS

Seat.....$1.15 and up
Cushion..... 1.55 and up
Back..... 1.75 and up
Top..... 5.65 and up

$10.20

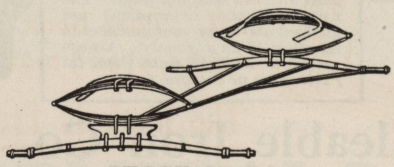
Double Trees With Single Trees Attached

Buggy and Surrey Size.....each 75c.



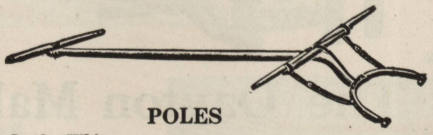
BENT REACHES

Assorted Sizes.....6 for 60c.



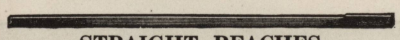
BUGGY GEARS

Each.....$5.95



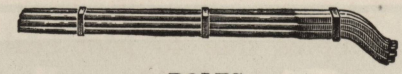
POLES

In the White.....$3.35
Painted..... 4.35



STRAIGHT REACHES

Assorted Sizes.....10 for 60c.



POLES

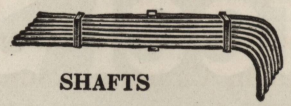
Buggy or Surrey Size.....Per Bdl.,$6.95

BUGGY AND WAGON AXLES

95c. and up. We carry all sizes

AXLE BEDS

Assorted Sizes, Drop.....14 for 60c.
Assorted Sizes, Arch.....10 for 60c.

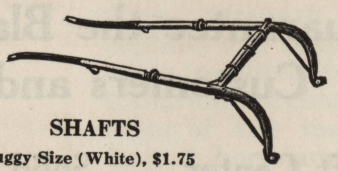


SHAFTS

Buggy Size, Per Bundle.....$4.95
Surrey Size, Per Bundle..... 5.50

Buggy and Surrey Cross Bars

Assorted Lengths.....10 for 60c.

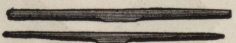


SHAFTS

Buggy Size (White), $1.75
Buggy Size (Painted) 2.40

SPRING BARS

Assorted Sizes.....14 for 60c.

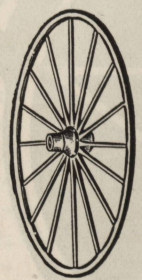


Buggy and Surrey Single Trees

Assorted.....10 for 60c.

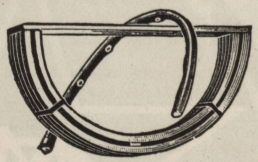
BAILEY BODY LOOPS

65 cts. and up.



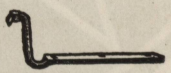
LIGHT WHEELS

With Steel Tire on.. $ 4.95 and up
With Rubber Tire on. 11.75 and up
We make all sizes.



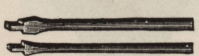
RIMS

We carry all sizes
Plain Rims.....$ .95 and up
Beveled Rims.... 1.40 and up
5 pieces Bored and Rounded Rims, assorted sizes, for 60c.



BODY LOOPS

2 set (8 pieces) for 65c.



BUGGY SPOKES

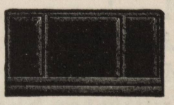
Per 100
1 1/8 in. Sar. Pat...$2.95
1-in. Sar. Pat..... 2.25
1 1/4-in. Sar. Pat... 2.65
1 7/16-in. Sar. Pat... 3.50
1 1/2-in. Sar. Pat... 4.00

Elliptic Springs

75 cents and up

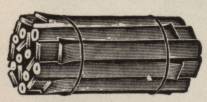
HEAD BLOCKS

Assorted Sizes
10 for 60c,



DASHES

18-in. Leather.....$ 45c.
20-in. Drill.....25c.
22-in. Leather..... 1.20



Wood Hub Spokes

Per Set
2-in.....$1.85
2 1/4-in..... 2.05
2 3/8-in..... 2.15
2 1/2-in... 2.25

HOW CAN WE DO IT? WRITE TO-DAY AND LEARN HOW.

Adjust your wants to the sizes and styles we furnish at the above prices

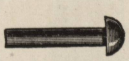
AND SAVE MONEY.

Our catalogue gives full description of sizes we furnish at the above prices, also

Special Freight Offer. We Give 3% Off for Cash.

A. Wheel, Top & Hdwe. Co.

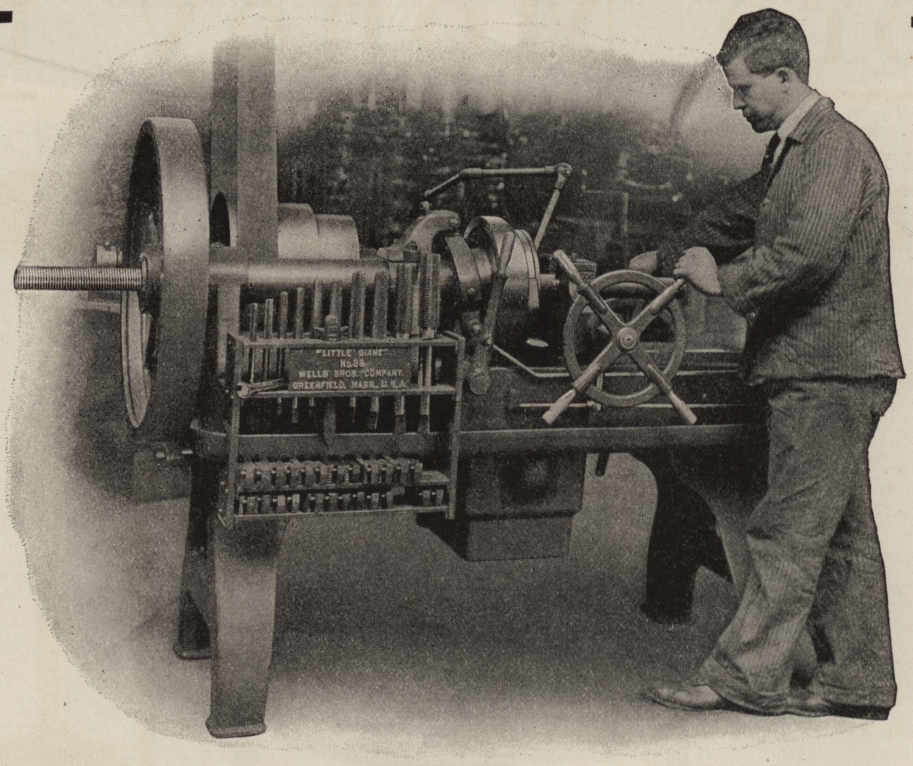
1100 Sycamore St. Cincinnati, O.



Wheel Head Rivets

Assorted Sizes
15 lbs. for 65c.

The Greatest Little Giant On Earth



This Machine Takes the Place of Old Fashioned Muscle

It puts threads on bolts or screws
It taps threads in all kinds of nuts
It stops automatically when the cut is finished
Works fast or slow—just as you like it

You Need This Machine, Mr. Blacksmith,

to enable you to keep pace with modern requirements in bolt-threading and nut-tapping.

---

3 SIZES—3 ranges of cutting assortments

1 QUALITY—1 design of automatic opening die

Write For Complete Catalog to the Makers

WELLS BROTHERS COMPANY

Greenfield, Mass.

NEW YORK CHICAGO LONDON

More Money for Blacksmiths

A Horse Clipping Outfit for $7.50

Large numbers of blacksmiths add many extra dollars to their yearly profit by clipping horses. **You** can do the same. **You** can add a new branch to your business—a horse clipping branch—at an outlay of only $7.50.

NO DULL SEASONS

Horses need clipping when you need business. In other words, the horse clipping season is in full swing when the regular business of blacksmiths is getting dull. So, if a Stewart Horse Clipping Machine is part of your equipment, you have a busy season fifty-two weeks a year.

A BLACKSMITH'S BUSINESS

Horses need clipping just as much as they do shoeing; and clipping horses **is really a blacksmith's business.** Those who don't do it are turning down profits which rightly belong to them. Blacksmiths have more chance of getting the business, of giving satisfaction and **keeping** the business, than anybody else connected with horses.

STEWART No. 1 Horse Clipping Machine Only $7.50

The Stewart No. 1 Horse Clipping Machine. Price $7.50

And the investment is so small. The Stewart outfit, costing $7.50, is complete, ready to begin work. The outfit comprises a Stewart No. 1 Ball Bearing Horse Clipping Machine of the latest and most approved type, six feet of highest grade flexible shaft, and the same pattern Stewart One-Nut Tension Knife as is fitted to our highest priced machines.

The machine is practically indestructible; all gears are cut from solid steel bar, made file-hard; they are enclosed in an oil bath. There is practically no friction or wear.

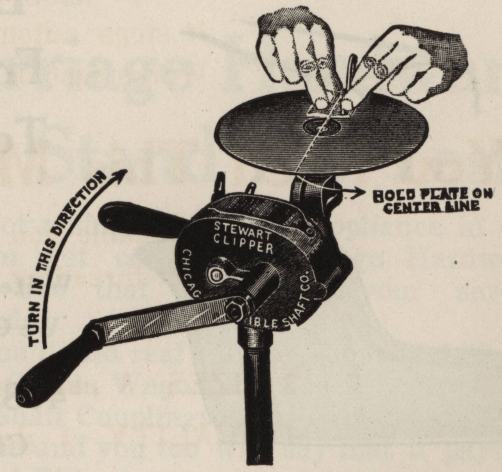
Ease of Operation—Anyone can operate a Stewart machine. The day of the hand clippers and the "expert" is over. The action of the Stewart is automatic, and ordinary laborers can clip horses **faster, easier and better** than has ever been known before. No high priced labor, no trouble, simplicity all through.

Start this new branch by getting a Stewart Machine. You can get it from your hardware or supply dealer or direct from us. We guarantee satisfaction. This extra business is yours—don't delay.

Chicago Flexible Shaft Company

630 La Salle Ave. CHICAGO

16 and 18 Reade St., New York



You can grind all kinds of Clipper Knives with this No. 11 Grinder

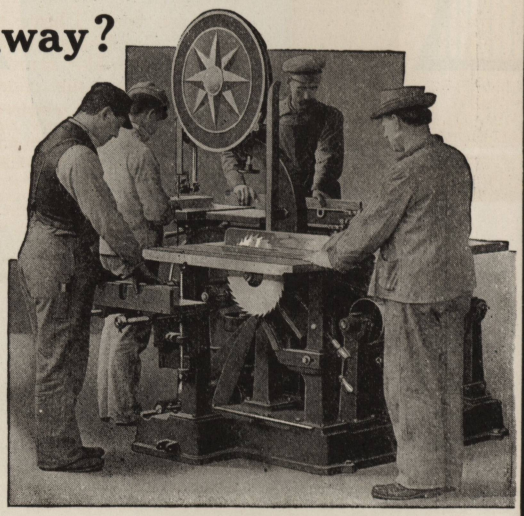
Fits all Stewart No. 1 Clipping Machines. Price of grinder with knife holders, grinder preparation, attachments to connect with clipping machine and full directions for sharpening clipper plates. $3.50

CRESCENT UNIVERSAL WOOD-WORKER

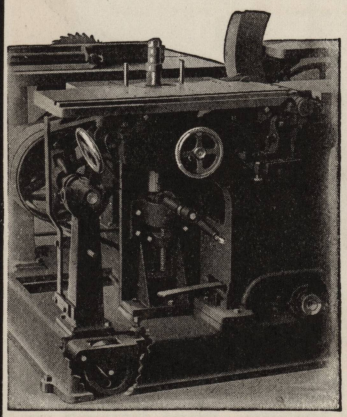
Do Wood Working Profits Slip Away?

Every bit of profit on each job in your woodworking shop ought to go into your own pocket. But it don't always travel that way when different parts of a job have to be done at a planning mill or there are other handicaps for lack of equipment.

There's no need of a single operation being done outside your own shop—you can earn for yourself the profit in each stage of all wagon or carriage work when



Four Men Working at a Crescent Universal Woodworker.



Sectional View of Part of Machine. Note Caster—Each Machine has Three.

The Crescent Universal Wood-Worker

is in your shop. Installing that one machine is all that is needed—it will equip your shop completely. This compact machine—that permits four men to carry on individual operations at the same time—is a combined band saw, jointer, reversible single spindle shaper, saw table and borer.

And as they are required you can add attachments for making mouldings, rounding poles and felloes, raising panels, grinding tools and planer knives, tenoning, mortising, dadoing or resawing. These parts purposely are made additional as they permit your selecting just the ones you can use for your individual line of work—you don't buy a bit of equipment you don't need.

Just Comment

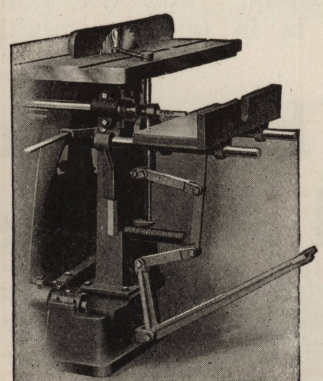
"If this was the only woodworker in America it could not be bought from me." Christ Hansen, North Bend, Pa.

"One of the best investments a shop could make." C. A. Johnson, Glendive, Mont.

"Each individual machine does its work perfectly and has the advantage of taking up so little space." R. U. Austin & Son, New Rockford N. D.

"Think is a grand machine." M. T. Person, Stockdale, Texas.

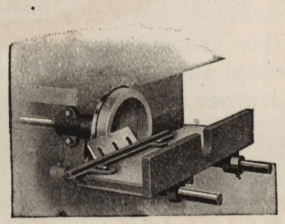
"Just as represented. Am highly pleased with it." W. M. Vause & Sons, Kingstree, S. C.



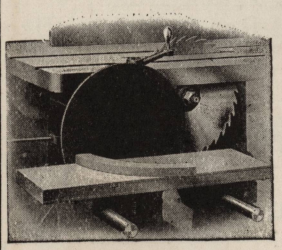
Borer Converted into a Hollow Chisel Mortiser.

The Way to Bigger Business

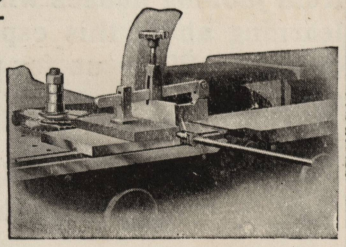
If you are trying to find some way that will advance your business you will find this Woodworker deserves serious consideration. There's a catalog telling all about the Universal—as well as the complete Crescent line of band saws, saw tables, jointers, variety woodworkers, planers, swing saws, disk grinders, borers, planers, and matchers,—that we think ought to be in the hands of every progressive Smith or Wagon Maker. Your name on a post card will bring your copy.



Knife Grinder Useful For Grinding Planer Knives.



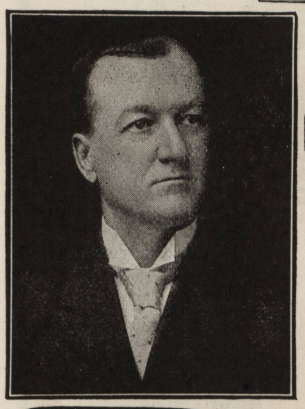
Pattern and Cabinet Makers Find This 14-Inch Disc Grinder Very Valuable.



Tenoner Arrangement Easily Adjusted For General Work.

The Crescent Machine Co.

245 Main Street Leetonia, Ohio



I WANT TO HELP YOU MAKE MORE MONEY

For ten years I have been helping American Blacksmith readers to make more money. Scores of "Our Folks" have worked up a good profitable business on my guaranteed knives. If you want to make more money easily and without it interfering with your present profitable business just consider my proposition. Here it is in a nutshell:

I will furnish you a complete line of my hand-forged, oil-tempered, butcher, poultry, kitchen and handy house knives—*Each Knife Stamped With Your Name*—finished or semi-finished, just as you want them. And I furnish them at a price that insures a big profit to you.

CONSIDER THESE FACTS. The butcher, the farmer and the house-wife are tired of paying out good money for poor knives,—knives that are quickly dulled or easily nicked. Take advantage of these facts. Talk hand-forged knives to them.

Point out your name stamped on the knife and say: "Here's where you can get more just like this one, or two new knives if this one is not right." You can often talk up a knife sale when "blowing up" your fire, shoeing a horse or fixing a wheel.

Special $5.00 Assortment for Trial Order, 42 knives, different styles and sizes, each stamped with your name.

Your Name on Each Blade Means Many Repeat Orders

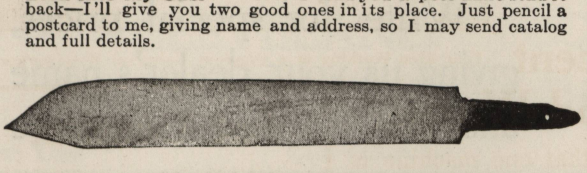
		Retail
Six 6-inch	$ .50	$3.00
Six 7-inch	.60	3.60
Three 8-inch	.75	2.25
One 10-inch	1.00	1.00
Two 6-inch Sticking	.50	1.00
		$10.85

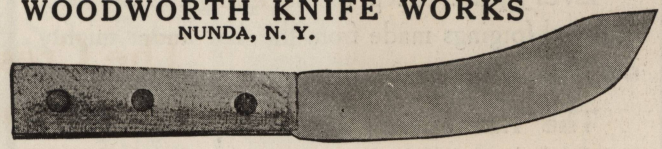
		Retail
Two 6-inch Skinning	$ .50	1.00
Two 7½-inch Bread	.40	.80
Two 7½-inch House	.40	.80
Six 4-inch Poultry	.25	1.50
Twelve Assorted Kitchen	.15	1.80
		$5.90

Liberal discounts with orders for 100 knives or more. Send me $1.00 and I will forward ½ dozen sample knives.

I Am Fair and Square Look into My Offer Ask any bank in Nunda about me. If ever I send you a poor knife send it back—I'll give you two good ones in its place. Just pencil a postcard to me, giving name and address, so I may send catalog and full details.

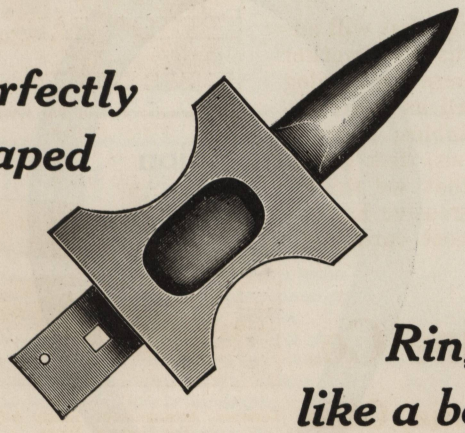
F. E. Woodworth, Proprietor
WOODWORTH KNIFE WORKS
NUNDA, N. Y.





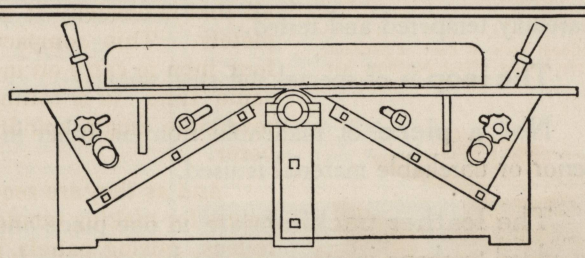
Write today for Folder No. 22, GIVING REVISED PRICES

SWEDISH IRON & STEEL CORPORATION
SISCO
NEW YORK-NEW ORLEANS



Perfectly shaped

Rings like a bell



A complete 5 inch Bench Jointer for only $30.00. Take a look at the above cut and then think a few thoughts.

It will plane and joint all of the timbers that go in a common wagon, and any amount of other work that comes along.

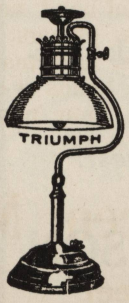
Bolt one of these Jointers to your work bench, put on the belt and it is ready for work, and goodby to hand axe, draw knife and jack plane.

Write for further information and prices of larger sizes and for our 30 day's trial offer.

W. L. SHERWOOD **Kirksville, Mo.**

Lamps and Heaters for the Blacksmith Shop TO USE AND TO SELL

We can save you 50% on the cost of your lamps, or Lighting Systems, and another 50% on the cost of lighting and operating over gas, kerosene, electricity or any other artificial light.



Every user, and there are thousands using our

New Triumph Lamps

and Systems, knows and will say they are the brightest, safest, cheapest, simplest, easiest managed and most economical in operation, and satisfactory lamps made, and are as good as 42 years' experience can make them.

They meet all requirements of Home, Store or Business. Turn up and down like gas, can be left burning at a mere glimmer and instantly turned up to 600 candlepower. Operating expense less than one-quarter of Gas, Kerosene or Electricity.

REAL COMFORT HEATER.

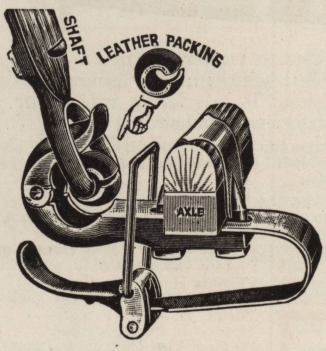
An Instantaneous Heater burns gasoline instead of kerosene. The Blacksmith has many uses for it. Heats a room in a jiffy, without smoke or smell, at less than one-quarter the cost of kerosene. **Write for A.B. Catalog, Dept. 12. It tells all about them.**

The Brilliant Gas Lamp Co. **1009 S. Wabash Ave., Chicago**

THE BRADLEY

BALL-BEARING

Carriage Coupler



OPEN

The Bradley Ball-Bearing Carriage Coupler is made entirely of steel.

Every part, except the flat spring and the loop, are steel forgings made from the bar under mighty drop hammers.

The flat spring is cut from high grade, crucible sheet steel, formed when hot and then carefully tempered and tested.

The loop is of special stiff steel wire.

Not a piece of malleable iron or other inferior or unreliable material is used.

The leather packings are in one piece and moulded to shape in machines made especially for this work.

The retaining rings keep the leather packings in place and are indispensable where shafts and poles are frequently removed.

Placing the loop over the end of the cap and drawing the thumb lever back against the flat spring closes the coupler, locks it and takes up any wear of the leather packing.

An absolutely non-rattling, quick-shifting carriage coupler.

Circulars and prices upon request.

C. C. BRADLEY & SON

SYRACUSE, N. Y.

Champion Front Snow

Champion Shoes

can now be obtained everywhere.

Write for special prices, giving us your dealer's name and mention this paper. We can save you money.

Quality of material is our specialty. Send for sample and the best horse shoe pin ever given away.

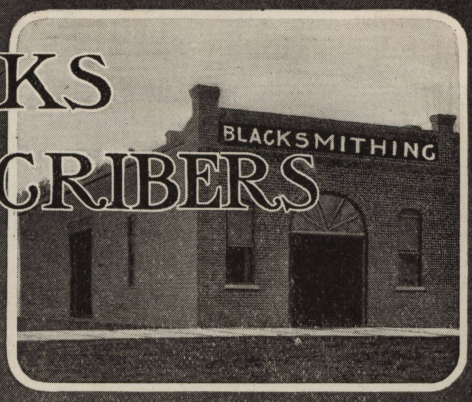
Champion Horse Shoe Co.

Pawtucket, R. I.

Champion Hind Snow

INDEX TO ADVERTISERS

TIMELY TALKS WITH OUR SUBSCRIBERS



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Associates: James Cran - - Bert Hillyer - - A. C. Gough - - Dr. Jack Seiter

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Subscribers should notify us promptly of non-receipt of paper or change of address. In the latter case it is necessary that you give us both the old and the new address.

To the Strangers

As this paper will go to quite a number of craftsmen who have never before seen THE AMERICAN BLACKSMITH, we want to say that this number of THE AMERICAN BLACKSMITH contains just as many reading pages as every other number. In every issue you will find high-class articles, practical information and substantially the same high quality as is observed in this number. You'll never find stale clippings, trade puffs or similar matter of low standard in these pages. Every article published in THE AMERICAN BLACKSMITH is published because it is helpful and practical; because it is of sound value to some department of blacksmithing.

The Prize Contest

The prize contest which was to end on December 31, 1913, has been extended to February 28, 1914. This has been thought best in order to give both new and old subscribers a fair and equal chance. A big pile of contest letters have already been received and its going to be pretty hard to decide which letter wins. If you haven't already entered a letter, write one right now and get a look at those fifty cartwheels.

To Oklahoma

Every smith, shoer and vehicle man in Oklahoma and the adjoining country should plan to go to Tulsa, January 19th and 20th, for the Fifth Annual State Convention. Headquarters will be at the new modern Oklahoma Hotel. There will be crowded into those two days of January all kinds of smithing talks, demonstrations and inspiration to last any real live smith for the next year. Don't forget—be in Tulsa, Oklahoma, on January 19th and 20th. Write to Mr. E. W. Reedy, Secretary, at Tulsa, Oklahoma, for full particulars.

Subscription Agents

When a stranger solicits your subscription to THE AMERICAN BLACKSMITH, or any other publication, insist upon his showing you absolute proof that he is an agent in good standing and is employed by the publication which he represents. Don't, under any circumstances, give the man your money if you are not sure that he really works for the paper he says he does. No matter what the man offers you—no matter what price he makes—no matter what premium he promises to send—DON'T GIVE HIM YOUR MONEY IF YOU ARE NOT SURE.

Contents, January, 1914

The Past Year

The first of a new year is always an excellent time for review, and it is with a good deal of pleasure that we review the past year and view the changes that have taken place in the craft; and changes decidedly for the better have taken place in practically all departments. There is a very decided upward trend that is stronger and more apparent than at any previous period in the history of the trade.

Naturally, our pleasure in viewing and observing these changes is occasioned somewhat by the fact that "Our Journal" has helped in bringing about these changes. The degree to which THE AMERICAN BLACKSMITH has helped in these matters is perhaps best told in detailing a few of the things "Our Journal" has done in the past year.

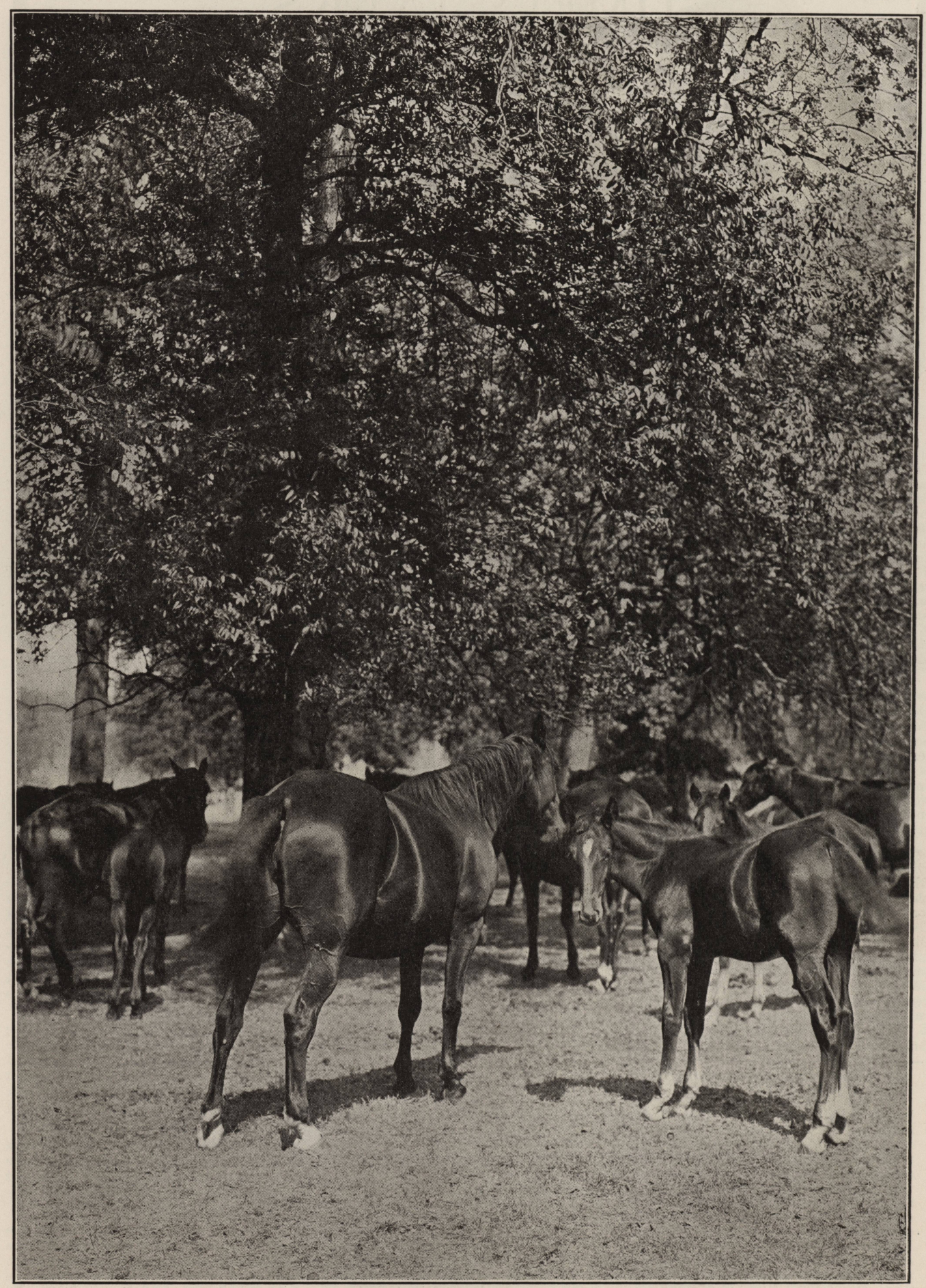
First, let us look through the pages of past issues, and observe the amount of truly helpful and practical business information that has been placed before our readers. Not merely telling the shortcomings along the lines of business, accounting and cost-keeping, but showing how to do business in a business way.

And then observe the Bowden System—can there be greater or stronger evidence on the part of THE AMERICAN BLACKSMITH as to whether or not it is sincere in its work for a better craft? A practical, easily-worked bookkeeping system that the great majority of general shops can use (and sold at cost). If you don't believe it, get prices on a similar outfit.

Then observe the high standing of the articles that have been published; note the titles, the names of the authors and the high order of the illustrations. Several of the articles published during the past year were on subjects never before touched upon either in textbooks or magazines.

As a result of the articles on the building of an oxy-acetylene welding plant, hundreds of smiths have installed these plants and have put themselves in readiness to compete with the larger shops.

And so we might go on pointing out the various articles that "Our Journal" has published during the past year and which we believe have at least in some measure helped the craft by helping the individual members of the good old trade.

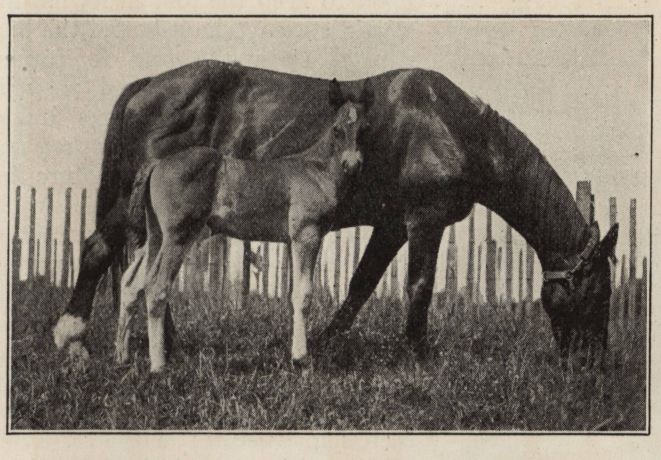


KENTUCKY TROTTING MARES AND FOALS

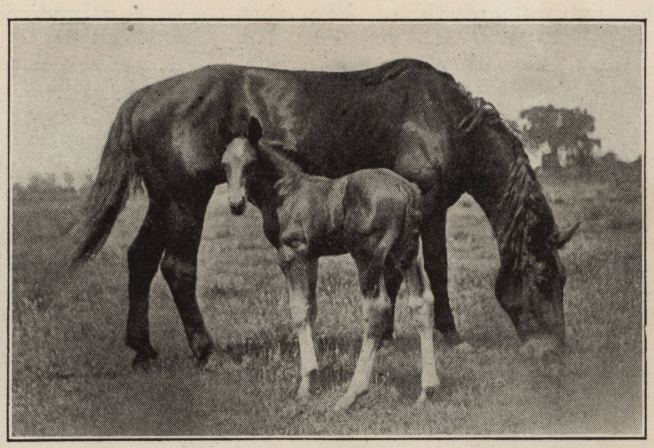
The Care and Shoeing of the Colt's Foot

DR. JACK SEITER

WHEN shoeing a colt I have found that a study of the gait of its parents, when possible, is of great assistance, for, in correcting a fault, it is well to know whether it is individual or hereditary. And before going into the subject of this article I wish to register a note of warning as regards heredity of gait. Time and again have I seen a breeder attempt to produce a colt of good conformation by crossing a horse of excellent structure (one with which the most exacting judge of horseflesh could find no fault) with a spindle-legged, knee-knocking mare; simply because she was well bred or had considerable speed. Naturally, he figured that the stallion would predominate in this union and the colt would be of the desired conformation. I have seen this mistake made year after year. The influence of heredity (for bad as well as good) cannot be better illustrated. The result is usually a leaning toward the bad, and the colt is usually of faulty conformation in one or more respects. Naturally, this condition will also exist if we reverse the order of things and cross an ill-structured stallion with a perfectly-developed mare. The bad will invariably crop out in preference to the good. If more attention were paid to the conformation of both the sire and the dam we would not be obliged to cope with the large number of misfit animals that are raced today. It is not uncommon to hear some horseman remark that "Such a colt has license to be very fast, but he hits his knees or toes out with one foot," or some other malformation handicaps him from being a world beater. And after several years of training, during which time the horseshoer and the bootmaker receive enough money to purchase a good animal, the colt is given up as a bad racing prospect and is retired—if a filly—to the broodmare ranks, to produce more of the same type; if a stallion—to do stud service, to fill the country with more trouble-makers. These are the sort that drive prospective owners out of the business. But this thing has been going on for ages, and the chances are that it will continue to do so as long as the breeders insist on breeding their "pets," regardless of conformation or temperament, attempting to get perfectly-developed animals that will do to race and fix a standard type of race horse. Many prominent stallions, standing at high fees, have been handicapped because wealthy horsemen would insist on breeding their worn-out favorite road mare to the stallion then in the limelight. Axtell and Bingen are recalled as two examples, but there are many more.



WHEN SHOEING A COLT STUDY THE GAIT OF ITS PARENTS



HEREDITY HAS A GREAT DEAL TO DO WITH A COLT'S GAIT

First Trip to the Blacksmith Shop

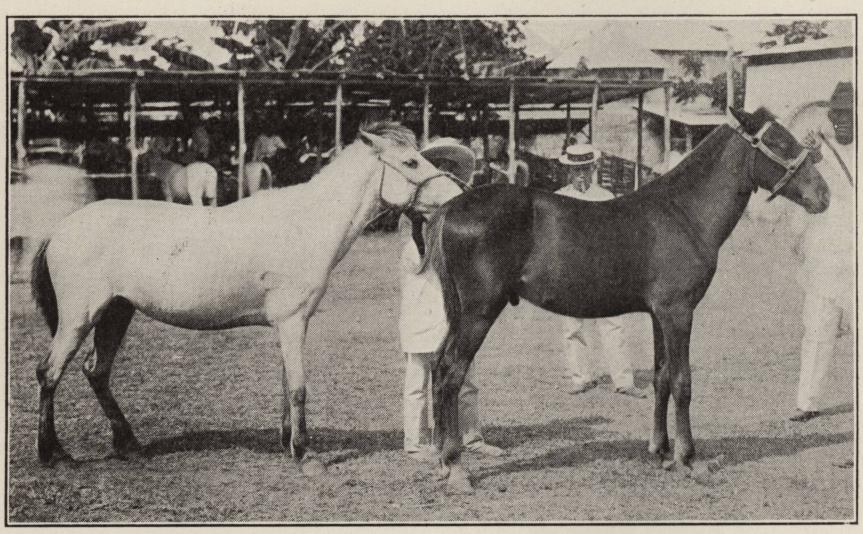
When the colt arrives at the age of two months its feet should be carefully examined. If dressing is needed it should be attended to at this time. Just as the human baby becomes bow-legged, the colt is liable to be foaled with or to acquire a faulty conformation. If the toes are excessively long they must be shortened. If the heels are abnormally

high they must be cut down. And if the foot shows more growth on one side than the other the high side should be trimmed down far enough so that the low side will also receive its share of the weight and bearing. If the colt shows the slightest inclination of being deformed, knock-kneed or nigger-heeled, we must dress down the outside of the hoof, especially the outer toe. It is also advisable in cases of this kind to rasp off the edges of the wall at the outer toe, enough so as to reduce it to the same thickness as the inner wall. By following these instructions at least once a month one can work wonders with a foot of this type.

Under no conditions should one apply a knife to the sole or the bars of the foot of a colt. Excessive cleaning out of the feet is not advisable, either. Naturally, we must look after the cleanliness of the feet, but unless there are positive signs of thrush one must not go to extremes—such as the free use of the "foot hook," which is often the direct cause of forcing filth into the cleft of the frog or bars. If the parts were left intact and filled up with the natural growth of horn that nature provided it would become almost impossible for the seat of the trouble to become infected. One must try and save all of the healthy frog, consequently only the ragged edges should be removed, for by carving out the healthy portions of the bars or the frog we only invite future trouble in the form of contraction and consequently more thrush. In the majority of the cases the knife is entirely unnecessary, but generally a good washing out with warm water and soap to which some good antiseptic solution has been added will relieve the trouble. After this the foot must be thoroughly dried (generally, it will dry out by itself in a few minutes). Then the parts involved, the cleft of the frog and the parts surrounding the frog and bars, must be packed with some antiseptic powder. It is also a good plan to force some cotton or oakum into the crevices to help retain the powder in place. Several treatments of this kind generally suffice to cure the most stubborn case of thrush. But, as in all other cases of affliction that horseflesh falls heir to, an ounce of prevention is worth a pound of cure.

Care in Dressing Hind Feet

In dressing the hind feet it is as a rule advisable to keep the toes short and well rounded off, but the conformation must never be lost sight of. If there is the slightest sign of curby hocks we cannot cut the toes down too short nor keep the heel too high. And where there is a strong predisposition to this unsoundness early shoeing is strongly recommended—the shoe to be square-toed and set well back from the toe, and the heels to be high and of good length.



A TYPICAL CASE OF "UP-BREEDING"—THE HALF-BRED COLT EXCELS THE DAM IN POINTS AS WELL AS IN SIZE

Now, the above rules are simple, so simple in fact that they are known alike by the humble stable boy and the prosperous owner, but we often overlook small details; consequently, the oftener we have them drilled into us and the oftener we are reminded of them the more apt are we to remember them. If we overlook the most minute detail which goes to build up an animal we will have a correspondent weakness somewhere; and "A CHAIN IS ONLY AS STRONG AS ITS WEAKEST LINK."

With the above precautions and preventives ever before us we will have the proper sort of a foot to work on when the time for the first shoeing arrives.

The first shoes should be applied for protection only, consequently they must be as light as possible and the nailholes as few as possible and punched well toward the toe, so as to allow for the natural expansion of the heels. The foot should be leveled with the rasp only; no knife must be allowed to mutilate the sole, the frog or the bars. If we leave those structures intact and apply a thin shoe we do not rob the frog of its function—that of acting as a cushion not only to the foot but to the entire limb, also. The frog is the one thing we can depend upon to keep the foot in its natural elastic state. The sole and the bars depend upon the frog to furnish them with moisture, and they in turn protect the structures immediately above them. If the frog and bars are left intact as nature intended they should be we would not be troubled with contraction and its sequels—such as corns or quartercracks. The frog takes care of the entire foot. Man has as yet discovered no substitute that will take the place of the good, healthy, un-mutilated frog as a moisture-secreting structure; and never under any conditions should it be cut into. It is permissible to cut off the ragged edges, but there are few who can resist the temptation to cut off a little more than is necessary—the idea being to give the frog a symmetrical appearance—to make it take on the appearance of some of the pictures we occasionally see entitled "A natural foot." The fact of the matter is, that a natural foot, untouched by the hands of man or his misery-producing tool, is about as unsymmetrical a piece of handiwork as the Creator ever endowed any animal with. Yet we attempt to make a model-shaped organ out of this crude-

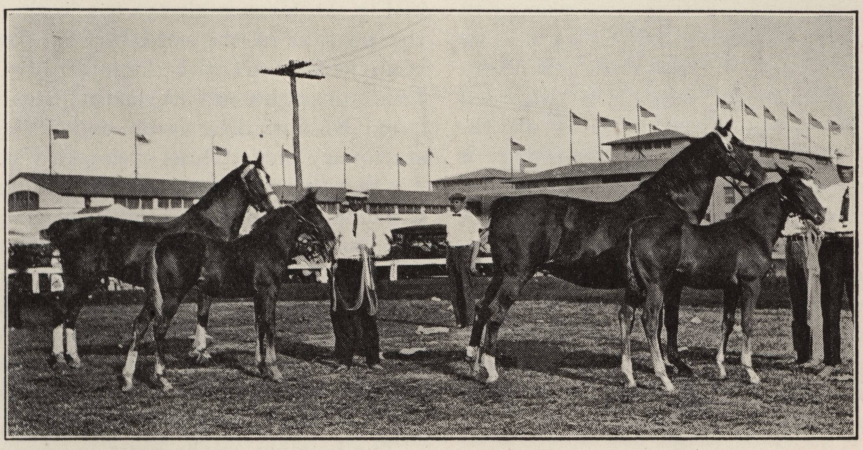
appearing mass of sensitive and insensitive tissue. It is undesirable to interfere with the growth of the foot, at all, outside of reducing the wall sufficiently to enable us to get a good bearing for the shoe. The frog, bars and sole must never be touched. The more sole we leave, the less will we have to contend with bruises and corns. The more frog bearing we can save, the more jar and concussion will we prevent. Consequently, we will have to cure fewer corns and quartercracks, and above all we preserve the natural moisture which evaporates the moment we apply a knife to the parts and thus open the moisture-secreting cells.

Hard Frog Unnatural

An animal will go lame if it steps on a pebble or a rock, especially if the sole, bars and frog have been excessively pared out. A frog that has been trimmed to the extent of robbing it of its natural function and in such a manner that it is forever kept off the ground will dry up and become as hard as a piece of stone. Most horsemen will admit that a stone will bruise a foot, but it is difficult for some to realize that a dried up frog is just as hard as a stone. The fact of the matter is they both do the same damage to the foot, with this slight difference, the stone acts on the sole, only, whereas the frog acts upon the sensitive structures that underlie it—the fatty frog, the preforans tendon (where it runs over the navicular bone to find its attachment on the semilunar ridge of the coffin bone), and above this the navicular bone. Can the frog protect those parts when it is robbed of the power to do so? Hardly.

"No foot—no horse," "No frog—no foot" are two true sayings; consequently, we must consider the frog as a link in the chain. In order to have a perfect working animal, all parts must work in unison. If even the most insignificant structure is out of order we are in trouble—the chain will have a weak link, and it matters not how powerful, speedy or game an animal is, when the crucial test arrives the entire structure will be no stronger than its weakest link or organ.

We hate to be told the truth. We do not like to have the little things that go to build the large ones drilled into us; and the majority of horsemen upon reading the above will say: "We know that much ourselves." Certainly you do—but it's the things we know the most about of which we grow careless. We are too anxious to learn something new; consequently, forget the old and fundamental principles of our work. For instance, if a horse becomes lame, it matters not where, we look for something to cure the lameness—a hot iron or a liniment that may be still hotter. We do not understand the action of them, but they are the things we invariably go after; instead of looking after the little things, the things we understand and the things that are the direct cause of our troubles. And if any one should endeavor to explain them to us we would exclaim, "Why, I know that much myself!" Certainly you do, but why don't you use your knowledge before you are in trouble?



IT IS WELL TO KNOW IF THE COLT'S FAULTS ARE INDIVIDUAL OR HEREDITARY

Changes in the Colt's Gait

The changes that take place in a colt's gait after being shod are due in a great measure to the abnormal changes that the structure of the foot often undergoes; changes that are not due to the ignorance of the persons in charge as much as to carelessness. In a natural foot the sole is perfectly flat. The frog, the bars and the sole all have an equal bearing upon the ground. If we take off just enough of the wall to get a level bearing surface for the shoe and then apply a thin strip of steel (the thickness not to exceed the amount of wall we have taken off) we will shoe according to nature or as near as possible to nature. Of course it is understood that the bars, sole and frog are to be left intact. The following is, however, the general procedure: the sole is carved out, the bars are cut out and the frog is cut away and shaped up. Then a shoe is applied that is usually from a quarter to a half inch thick. The moment this shoe is applied, the sole, frog and bars are robbed of their functions as weight-carriers and concussion-destroyers. They dry out and become atrophied and as hard as a stone. The colt is worked, and goes well for the time being, but after a few weeks he shows signs of going rather short-gaited, does not extend himself as he should or as he did when first shod. Again he is taken to the shop. We all know what the orders are: "Do not take a thing off of his feet and apply a heavier shoe"—a thicker shoe—in the effort to improve the action. In this manner the frog and sole are still further elevated from the ground with which nature intended they should come into contact at every step. After this change we have in rapid succession the dropping in of the quarters and contraction of the feet; followed by corns and quartercracks; and the foundation is laid for that dreaded of all foot troubles, navicular disease. When the hard, atrophied frog comes in contact with a stone or a rock, and the sensitive structures that it is supposed to protect with its rubber-like elasticity are bruised, then there will loom up in the near future a bloodshot sole, a bruised tendon or navicular disease.

Natural Dressed Foot

When the foot is dressed in the proper manner, and after it is shod receives the proper attention and

care, it is essential to keep the feet soft and pliable. It will be found that not one half of the weight usually applied is necessary to balance a colt.

Now this may seem a broad statement to make, but it is a fact, as I have discovered during twenty years' work with the light-harness horse. Considerable of that time was spent shoeing colts and taking care of their feet on some of the most prominent stock farms of this country. What I say is not theory but fact; as the average horseman or horseshoer is well aware. We all know better, but often overlook the small details, always looking for large causes. Instead of getting at the seat of the trouble and removing it, many entirely overlook the real cause in their endeavor to correct the gait with new fangled shoes, toe weights, pads, bits, straps and the like.

The Horseshoer

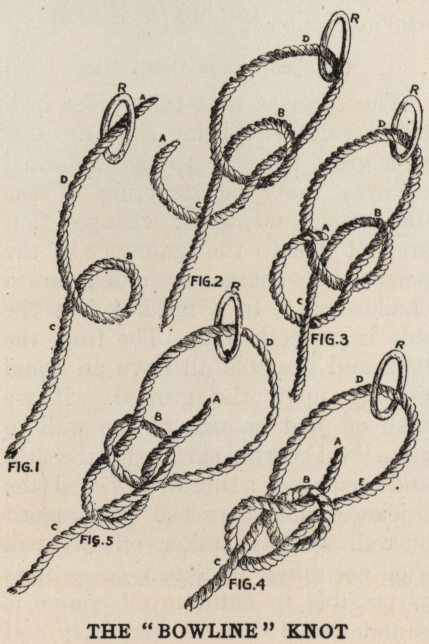
Knots and Ties for Holding Horses

THEODORE MACKLIN

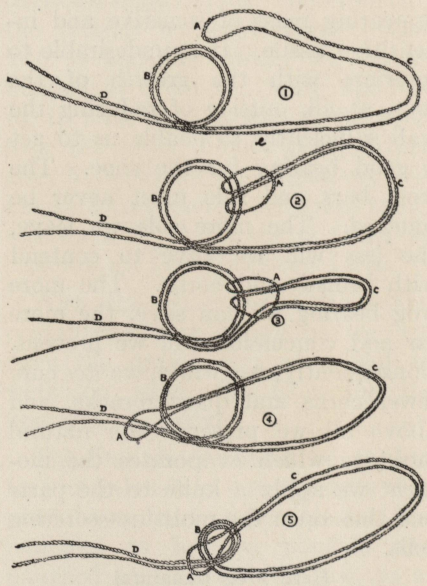
The shoer can often use a rope to advantage in overcoming a vicious animal or in holding an excited horse, and he will find a knowledge of suitable knots and ties of value. Without doubt the most useful knot is what is called the bowline. Next in importance is the bowline on the bight. These are the two important knots required in making the hackamore—used to lead, to tie or overcome horses.

The common bowline knot is best made by taking a rope and passing one end through a ring or around a post, as shown in Fig. 1 (see the "bowline"). For convenience, in speaking of the parts of a rope, we will say that the portion of the end used in the knots for tying is the end, marking it with letter (A), Fig. 1. The portion marked with the letter (D) is called bight, and the part that runs from (D) to the other end is known as the stationary part. After passing the end (A) through the ring (R) a loop (B) is made in the stationary part, as shown in Fig. 1. Care is always taken that the portion of the cord (C) to (B) is under the part with the letter (D). Next, pass the end (A) through the loop (B) and afterwards under the stationary part (C), as shown in Fig. 2. Thirdly, pass the end (A) through the loop (B) above, as shown in Fig. 3. Lastly, hold the stationary part (C) in one hand and with the other take the end (A) and the portion of loop (E), pulling hard on them as shown in Fig. 4. In Fig. 5 is shown the side opposite the knot. This is the common bowline.

The bowline on the bight is necessary in using a rope to throw horses. It is made as follows:—Using a long rope, double it in the middle. Afterwards, about four feet from the end (A) Fig. 1, (see the "bowline on the Bight"), make the loop (B), taking care to have the stationary part (D) remain above the portion with letter (B) at (E) (see Fig. 1). Secondly, pass the end (A) through the loop (B), always passing it from above, as in Fig. 2. Afterwards, pass the end (A) over the portion with the letter (C) above the portion with the letter (C), Fig. 3. In the Fig. 4 the fourth step has been taken, showing the end (A) carried



THE "BOWLINE" KNOT



THE "BOWLINE ON THE BIGHT"

down over the loop (B) to the stationary part (D). To complete the knot, as shown in Fig. 5, hold the stationary part (D) in one hand and the portion with the letter (C) in the other hand, and draw on them hard.

Knowing how to make these knots it is very convenient to use them in the following cases:

Frequently the horseshoer needs a halter when all he has at hand is a long piece of cord. In such circumstances the hackamore is very convenient. This is a temporary halter which is very easily made and can be taken off without difficulty when no longer needed. On making the hackamore, pass the end of a long cord around the neck of the horse and tie a common bowline knot. Afterwards put a loop over the horse's nose as shown in Fig. I. In Fig. II it shows where another loop is put over the nose. Thirdly, pass the cord (B) of the second loop under (A) of the first loop, Fig. II, which is done by bringing (B) under (A) from the upper part, as shown in Fig. III. The fourth step is to leave the portion (B) in Fig. IV sufficiently long to pass it over the ears and leave it as shown in Fig. V. The final step is to pull down on the loop (C) shown in Fig. IV, to tighten the halter and allow for passing the rope around with the stationary part, as shown in Fig. V. If you wish to tie a horse when using said halter it is better to pass the end of the stationary part (D) through the loop (C), which prevents slipping and untying.

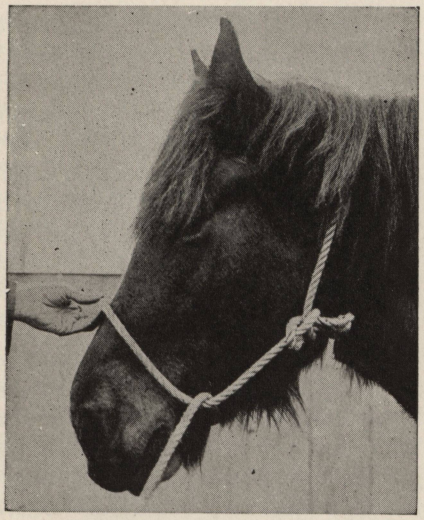


FIG. I—PUT A LOOP OVER THE HORSE'S NOSE

A very effective and simple way of breaking colts is shown in the accompanying photograph. It is also used for breaking horses of the habit of resisting the halter. Put a strong leather halter on the colt's head. Afterwards, using a long cord, pass one end around the colt's body above the cross and posterior part of the front legs. If possible an iron ring may be fastened to the end of the cord, but if this is not convenient a common bowline knot will give the same result. Through the ring, or bowline knot, pass the stationary part of long portion of the cord. Afterwards, pass the end between the fore legs above through the halter. Beginning to guide the colt with the cord of the halter, generally he won't go, but as soon as the cord presses on the nose, the colt will follow without the least resistance. The object of using an iron ring at the end of the cord instead of a bowline knot is to make the cord around the body of the colt loosen as soon as he is made to walk. When a horse acquires the habit of pulling the halter, this method is very efficacious to cure it. The cord is tied to the manger a little shorter than the halter, so that the loop around the body of the horse is tight before the horse contracts the cord of the halter. When the manger is very low, instead of passing the cord through the halter it must pass through a cord or loop that hangs from same; this prevents too hard pulling on the head of the horse.

Horses are easily thrown to the ground by using the pulling arrangement shown in the accompanying engraving. You must use a rope no less than 35 or 40 feet long. This is doubled in the middle and a bowline on the bight knot is made. Afterwards the loop is put over the head of the horse and adjusted to the desired size. You must take great care the loop isn't so tight as to endanger the comfort of the animal when he is thrown. Then the two ends of the knot are passed between the front legs and back around the ankles of the hind legs. It is preferable to use ankle bands with iron rings instead of the smooth rope. The rope is likely to scratch the ankles. When rings are used, the ropes are passed through them, one on each side, and afterwards through the loop of the bowline on the bight on each side. When the rope is put on the ankles instead of rings it must be wound around the principal rope before bringing it through the

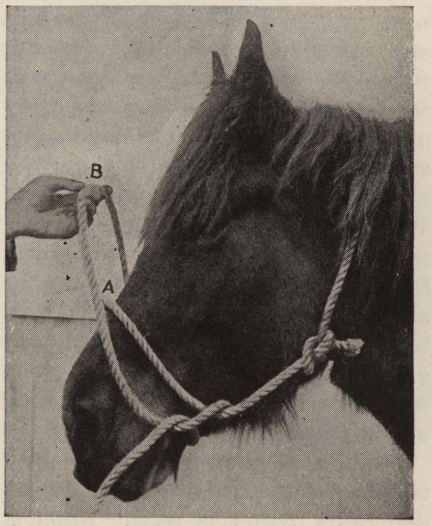


FIG. II—FOLLOW THIS WITH A SECOND LOOP

side around the horse's neck. See Fig. VIII. When you want to draw the horse to the right, the party who holds the rope on that side must be in front on the right, while he who has the other rope must be in back on the left. To throw the horse down, draw on the ropes firmly, in this way raising the hind leg up toward the abdomen. As soon as the animal falls to the ground the man who holds the halter must grasp the horse's head and turn his nose backward from the ground to keep the horse from rising.

To throw cattle, a simple method is shown in the photograph. Use a rope 35 to 40 feet long. Placing one end around the animal's neck, tie a common bowline knot, letter (A) (see Fig. IX). Afterwards, pass the knot around the animal's body, back of the shoulders, and make a half knot at (B). Finally, pass the

FIG. III—PASS THE SECOND LOOP UNDER THE FIRST

FIG. IV—THE SECOND LOOP SHOULD BE LONG

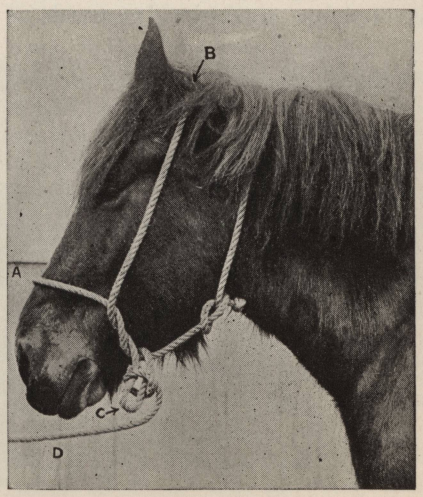


FIG. V—IT GOES OVER THE FORELOCK AND EARS

rope around the body on the hips and sides and make the half knot (C). It is preferable to have the rope pass across the spine in front of the hipbone on one side. This will prevent it from getting into the mud and from slipping back too far. When you are going to throw a cow, take care to have the rope pass in front of the udder. To throw the animal to the ground, draw the rope backward and on the side to which you wish the animal to fall. When it falls, turn the head of the animal upward to keep it on this side.

Besides, as the hackamore is not very convenient for cattle, a different temporary halter is used. Make a bowline knot on the end of a rope and pass around the animal's neck. Afterwards, make a loop on the stationary part of the rope and pass through the loop (A) in Fig. VI. After passing the second loop through the loop of the bowline knot, pass over the animal's nose, as shown in letter (B) of Fig. VII. To remove the halter, take the loop (B) from the animal's nose. This halter is very convenient when cattle are tied for dehorning.

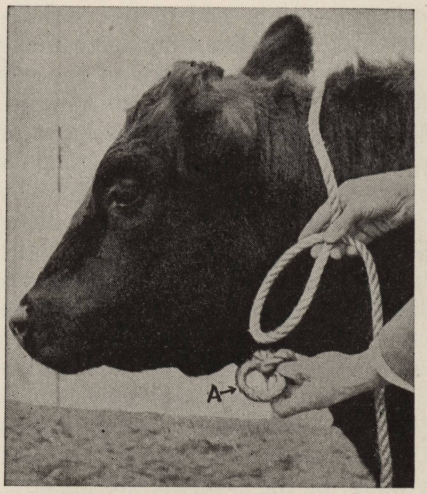


FIG. VI—A SIMPLE TIE FOR CATTLE

A Radical Cure for Quarter Crack

JAMES R. PINCK

It is often desirable to cure up a quarter crack quickly. The very nature of the foot and horn being to grow slowly usually makes the cure of any hoof crack a time-consuming process. The edges of the crack cannot, of course, be made to grow together. The crack can only be eliminated by growing healthy horn to replace that portion that has become cracked. Inasmuch as the growth of the foot wall amounts to but one fifth to one half an inch a month it will necessarily require considerable time to grow healthy horn in place of the cracked portion in the usual way.

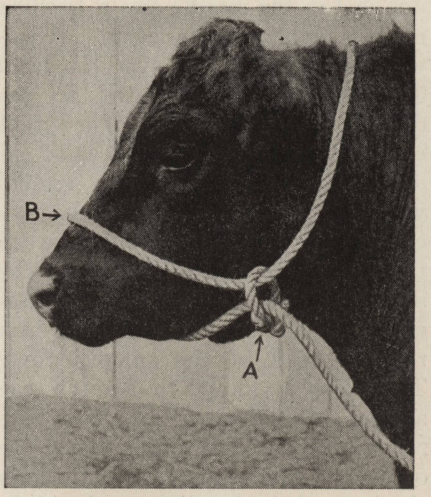


FIG. VII—THE LOOP PASSES OVER THE NOSE

The method of curing quarter crack as here described will give the animal a sound foot in thirty days. It is, of course, not always possible nor consistent to use this method of curing a crack. But when a crack is to be healed in the shortest possible time, and the horse owner is willing to pay for the extra trouble and work involved, the following method is the one to use.

The Treatment

First prepare and dress the foot as though shoeing in the regular way, being careful not to cut down the horn too much. Pare and dress just enough of the hoof so as to get the foot level and balanced. Leave all the horn possible so as to hold up the strength of the foot—as considerable horn will later be removed to allow for the treatment of the crack. After dressing the foot, fit it carefully with a bar shoe having no toe clip. Give the shoe plenty of frog pressure.

Now lower the quarter where the crack is situated. This should be done carefully but thoroughly, cutting down the quarter all it will stand. Do not open the heels. After lowering the quarter at the crack, take the rasp and rasp the wall away right down to the quick for a space of from an inch to an inch and a half on each side of the crack. Rasp the wall down well from coronet to sole; cutting the crack out entirely. It may bleed, but rasp out carefully until the cracked wall is entirely cut away.

Now prepare a false toe clip as shown at A in the engraving. This may be made from nail rod and should be about one eighth of an inch thick and about five eighths of an inch wide. If no nail rod is to be had,

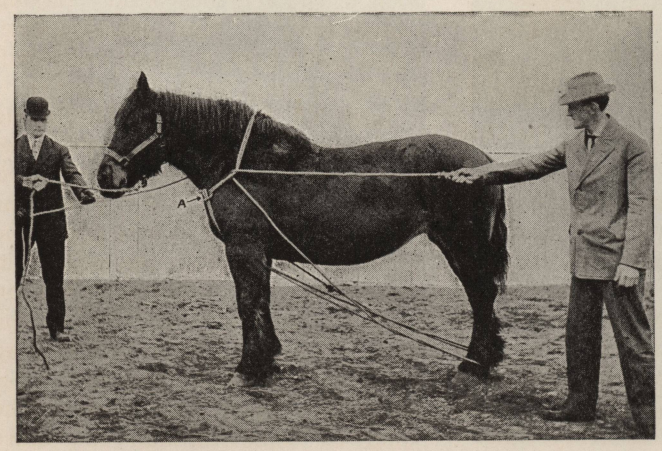


FIG. VIII—A PULLING ARRANGEMENT FOR THROWING A HORSE

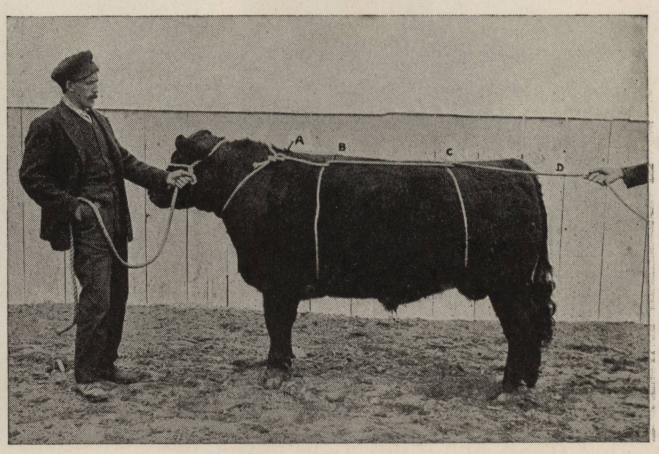


FIG. IX—A ROPE ARRANGED FOR THROWING A BULL OR COW

any soft iron rod will do. The clip is shaped as shown in the engraving. the part at X being bent at right angles and let into the toe of the foot where a recess is cut for the purpose before the shoe is attached. After cutting the recess to admit the end of the toe clip, the shoe is carefully nailed on, using a leather pad, and packing the foot carefully with tar and oakum.

After the shoe is on, take a wad of oakum, coat it heavily with balsam of fir and lay it in the rasped quarter. Fill the wound well with the pad of oakum and balsam of fir. Now put the false toe clip in place and, with a roll of surgeon's adhesive bandage one and one quarter inches wide, wrap the foot carefully. Go round and round the foot until the oakum and balsam of fir pad is well covered. Be sure to draw the bandage tight at each turn around the foot. When sufficient bandage has been applied, seal the end carefully, to prevent unwrapping, and then bend the upper end of the toe clip over and down on the bandage. Also cut the bandage away at the heels so it will not chaff the bulbs when the horse is in action. The bandage should not measure over half an inch wide at the heels after cutting.

The animal is now ready for the road or street, and if directions have been followed the horse will have a sound foot in thirty days.

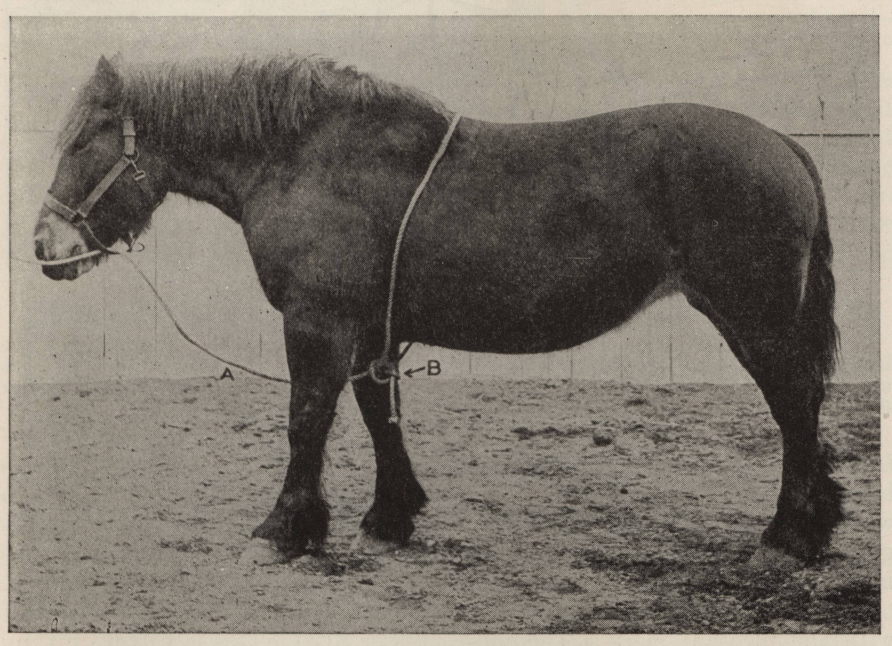


FIG. X—A SIMPLE ROPE ARRANGEMENT USEFUL IN TEACHING A COLT TO LEAD

The Business from a Practical Smith's Viewpoint—3

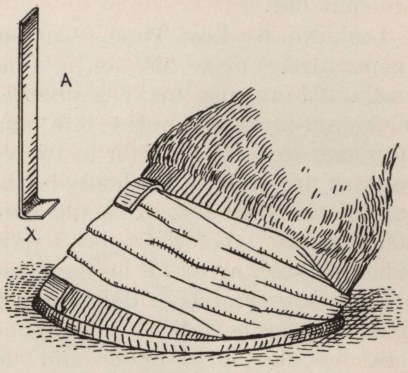
H. M. TOTMAN

Leaks and Their Remedy

It is a question whether there is any other business of equal magnitude where there are as many leaks through which profits disappear as in the blacksmithing business.

First—Work Done, but Not Charged. In a shop employing fifteen men, unless a thorough system is carried on, the aggregate loss from this one leak will amount to hundreds of dollars a year. Only recently the writer was informed by the owner of one of the most complete garages and repair shops in a near city that his loss was considerable on account of neighbors running in at the back door and getting small jobs done which never were charged or reported at the office. To stop this leak we have a special order book in which every job is entered, regardless of size, and the men are instructed NOT to handle a job without an order from the office. Then when the charge slips are collected at night they are compared and checked with the order book. Of course, there is hardly a day in the year but that some jobs have been forgotten to be charged by the mechanic, but this method catches them every time.

Another bad leak is occasioned by men not knowing how to proceed to the next job when one job is finished. It is the practice of the writer to make up order slips for each department every morning to cover the work for the day, so that the men need never ask about the next job. Small work will come in during the day that needs immediate attention, but the practice of order slips for the men will be found a time-saver and, of course, you know that "time is money."



A RADICAL CURE FOR QUARTER CRACK

Leak No. 3—Disorderly Shops. Order is heaven's first law, and is very essential here upon earth. A visit to the average custom shop will show a litter of all kinds of material strewn about—scrap iron, bolts and tools—causing unnecessary confusion. When a tool is needed, valuable time is lost in searching for what should be right at hand. I know shops that haven't been thoroughly cleaned up in twenty-five years. Have a place for scrap iron and rubber, and sell it at regular intervals. It means money. Then, too, an orderly, well-kept shop attracts the best trade by its very novelty.

Leak No. 4—Poor Arrangement of Machines, Benches, etc. Plan to have everything handy and have all tools of the very best kind. Buying cheap tools is pure extravagance. Good tools kept in good order will aid in turning work out quicker.

Leak No. 5—Loafers. This is one of the most common and worst leaks we have, and is generally confined to custom shops. Very often our shops are the rendezvous of all the idlers in the vicinity who indulge in story-telling and other conversation to the great injury and loss of the boss. This is a difficult leak to plug when once started. My method is to require every one entering the shop to come through the office first; if he has no business in the shop he doesn't get in. If he wishes

to see one of the men I call the man to the office. In this way all solicitors, agents, collectors and loafers are shut out.

Leak No. 6—Lost Time. Custom shops rarely make use of a time clock. Many men make a practice of being fifteen minutes late and stopping work at a quarter to twelve to wash up, etc. If ten hours is the rule of the shop a man should give 600 minutes' labor for a day's pay. When pay-day arrives if his envelope is short a quarter of a dollar you'll hear from him. Why should he cheat you out of a dollar and up every week by lost time?

Leak No. 7—Faulty Methods of Bookkeeping. As I devote one of these articles to this subject we will not consider it here, except to say that it is almost universal. The average proprietor thinks it unnecessary to do more than to keep the debit and credit accounts with customers. The real facts to know are what your business is amounting to from week to week. If one did a strictly cash business it would also be necessary to keep a set of books, as will be shown later.

Leak No. 8—Delay in Collecting Accounts. I believe this hits every one of us, and it is the one serious weakness with the writer. We are very apt to push our collecting only when we are pushed by our creditors, and then we look over the list of accounts receivable, and pick out the easy ones, leaving the hard ones for some more convenient time (which never comes). "We are so busy, you know," and the first thing "we know," some one has cleared out or "busted," and then there is another account charged to profit and loss. Meanwhile these accounts get so old that they are almost forgotten by the debtor, and disputes occur, allowances are made (knocking out all the profit), customers are lost and there is dissatisfaction generally. Why not give a definite time limit and require settlements? If any customers object, cut them out as credit risks. The fact is that most of us are cowards and are afraid of our customers. Why not have a frank understanding (without getting angry) by putting the entire question on a simple business basis in a friendly, courteous way? It can be done easier than we imagine. Don't forget that the favor in extending credit is TO THE DEBTOR—NOT TO YOU. Short bills make long friends. The ability to say "yes" and "no" and stick to it is an important factor in business success.

Leak No. 9.—Grouchiness. Perhaps the most important factor in business is courtesy, and it doesn't cost you a cent. We have all met men who were so courteous that a favor refused by them left us in a better frame of mind than we are when granted a favor by some surly, grouchy chap who grants it so grudgingly as to leave "a bad taste in one's mouth." We all like to trade with the pleasant clerk. The jobbers recognize this, and their salesmen are usually jolly good fellows. It is a business asset and goes a long way towards counteracting other failings. TRY IT.

Leak No. 10.—Neglect in Paying Bills. Only a very few of the custom shops discount their bills payable. If we could only realize that these discounts represent a profit in advance, that in the aggregate for the year amounts to a respectable sum. Two percent is the usual discount, but some houses allow 5% or even 6% in a few cases. A four months' account with 5%—30 days, equals 20% per annum; at 2% it equals 8% per annum. We can well afford to pay the bank 6% per annum and make 8% to 20%. If a man can show his bank a statement of his business that will show it is fairly profitable and he is a man of good habits he can generally get a line of credit sufficient to enable him to discount his bills payable. A business of $15,000 per year will use approximately $4,000 worth of stock. We can figure an average discount of 3% or $120. This is velvet, but by no means the only advantage gained. The discounting customer is highly prized by the jobber and receives preference when bargains are offered. Is it not worth while?

Leak No. 11.—Allowing Customers to Dictate Prices. Every one of us has undoubtedly met men who bring in work which is priced when completed, when calling, the customer, whose work has been taken care of according to his orders and instructions, tells us what he will pay. There

THE PRICE-MAKERS

Which one do you employ? Some smiths employ none at all. The Agreed Price List is better than no Price-Maker, but Cost Accounting is Best. Base your Selling Price upon conditions right in your own shop, *not* upon conditions as found in two or three other shops. Make your own prices, base them on *your own* costs and then stick to them.

are many of this kind. When a discussion of this kind arises I reply as follows: "You state what you want and I'll make the price" or "state what you will pay and I'll do the work accordingly, but you cannot dictate how the work shall be done and what you will pay for it." Run Your Own Business.

Leak No. 12.—Failure to Check Invoices. The writer has worked for more than one hundred different custom shops and never knew of but one shop which made a regular practice of checking and weighing or measuring goods. We do not charge jobbers with being dishonest (although there are such), but mistakes do occur and much more frequently than one would think. We believe it necessary and wise to require a copy of all orders given.

Check the invoice with your copy of the order, then the goods with the invoice; and then only can you be sure that you get what you pay for. Short weight or short measure, errors in footing or in multiplying, are quite common. Be Sure You are Right and Then Go Ahead.

Proper Care of the Forge Fire

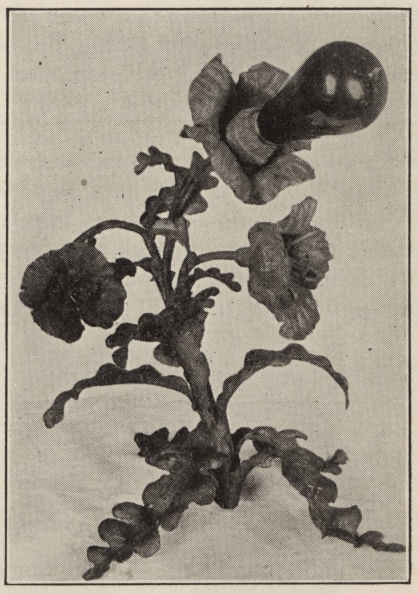
A. E. Bachman

There are a great many good points about the all-important question of a proper fire that should be known by every smith. It is the foundation upon which his work depends. And until he thoroughly understands his fire he will be handicapped in turning out good work.

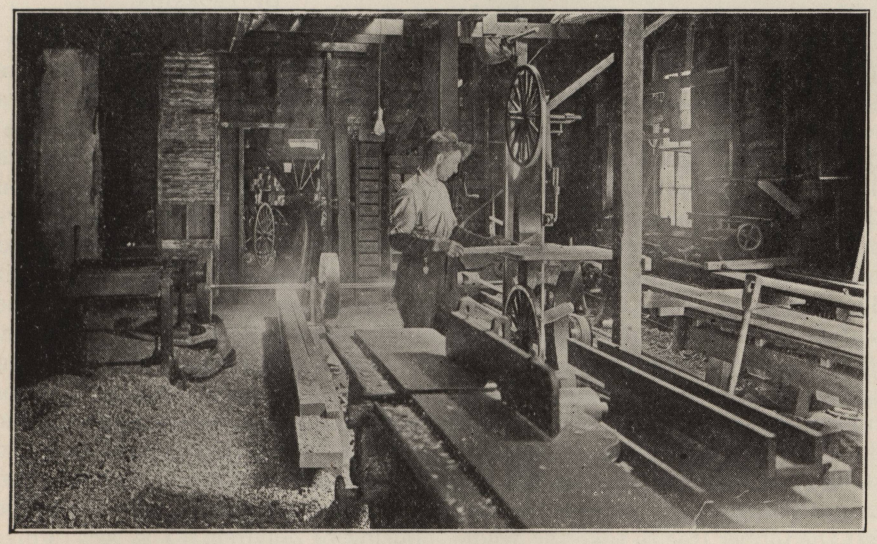
I had an idea that to be economical with coal it was necessary to have small fires, and the one great mistake I made was not having sufficient fire and heat for my work and not enough coal on to make a good hot fire. Another mistake one makes is to keep stirring the fire with the poker to get rid of the cinders. The proper way is to work until the fire has become almost all cinders, then take a small shovel and the lilly and remove all the coal and coke. The cinders should then be removed and a fresh fire started. It is almost impossible to make a good weld unless you have a good fresh fire, because the ends of the lap of iron are very apt to burn off.

When I first started to work in the shop I could not make a good heat and I was discouraged almost to the point of quitting, but the man with whom I was working consoled me by saying that all beginners had the same trouble and that I would catch on to the right way after a little practice. A few days after this I had a large piece of iron in the fire and I was working between a "sweat" and a "give up." The assistant foreman's fire was next to mine and I noticed that he had a big heat on, so I went over to him and asked how he made his fire. He gave me a little explanation which enabled me to see the point and I then tried to make my fire like his with a little help from him. This is the way he did it: He put on plenty of coke with a good deal of coal all over the iron, then gave it a slow blast until the iron was "soaked" or ready to take on the welding heat. He then gave it a still stronger blast until he could see through the openings of the coal the large drops of iron like beads of perspiration rolling down from the heat (which was a white heat). Next he took a small shovel and the lilly and removed the coke from the iron which enabled him to make a weld clean and solid. When he had finished, the weld was not discernible except for a little blue streak on the iron.

I have found after years of practice that a heat made in this way is the best, even in heating iron down to ¼-inch rod, and I must say that a bake-oven fire gives entire satisfaction.



AN EXAMPLE OF MR. JAMES CRAN'S ARTISTIC WORK



THE WOODWORKING DEPARTMENT IN MR. L. C. OLESON'S IOWA POWER SHOP

The Use of Garnishment Proceedings for the Collection of Money

In answering the following letter, written from Auburn, Ind., I can say something about the value of the proceeding which the law calls "garnishment" in collecting money:

Elton J. Buckley, Esq.

Dear Sir:—Please advise how to go about collecting a debt under the following conditions: I have a claim against a merchant which he practically defies me to collect. He has a stock of goods and fixtures which would probably bring no more than he is entitled to under the exemption laws, so he is sitting down, waiting

to see what I will do. Is there anything I can do? I hate to let the man beat me, but at the present time I see very little chance of doing anything else. I would say that the claim amounts to a little over $200. Please do not use my name if this is printed.

Respectfully yours,

K.

There is always a chance that a creditor in this position may be able to collect his money by the use of garnishment proceedings. Every State in the Union has a law allowing money due from A to B, to be garnisheed in the hands of A by C, whom B owes. Sometimes it is called a garnishment law, sometimes an attachment law, but under some name a statute of this character will always be found on the State statute books. It is a godsend to creditors—I have seen thousands of dollars collected through its use that would otherwise have been lost.

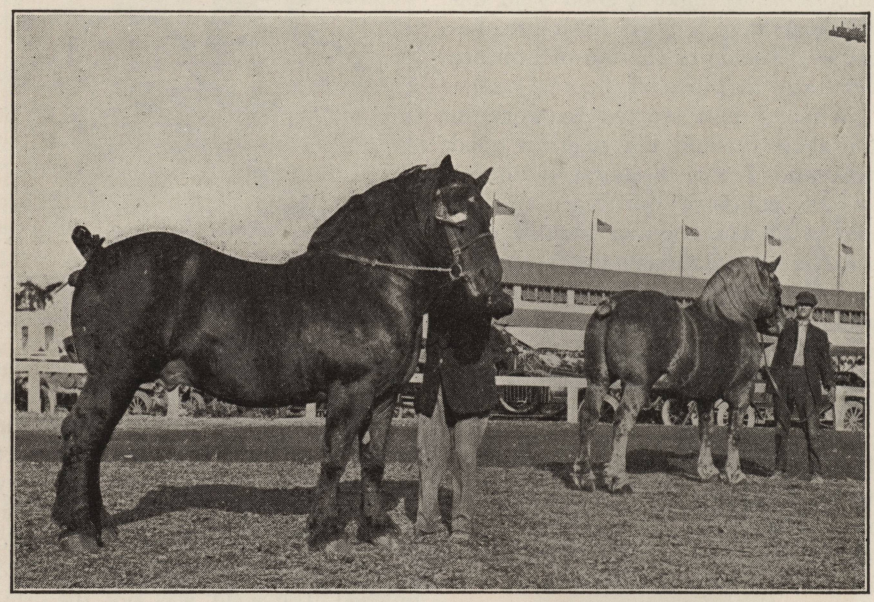
Where you have a debtor, especially one who is in business, and he seems to have nothing in his own name except stock, fixtures and other personal property which would about equal the sum allowed him under the exemption laws, it is usually safe to assume that he, too, has customers indebted to him. Attach the sums owed by those persons, and in many cases you have your claim safe. Every dealer except one doing a strictly cash business, can be gotten at in this way.

So, in the same way can a smith get at some customer who owes him money, though with less chance of success, because a consumer is less apt to have people owing him than a merchant. Still, almost everybody usually has *some* money owing to him, and a little shrewdness exercised in smelling it out will frequently yield good returns.

I have a case in mind where the debtor was a retail drygoods dealer. He was indebted to his jobber in about $3,000, and had become very indifferent to the account, as he had only a stock and fixtures which at forced sale would not have brought more than the fairly large State exemption. The jobber finally demanded payment, and was ignored. He employed a lawyer in the debtor's town, sued and got judgment. At the psychological moment the debtor filed a claim of exemption, and under this an appraisment was made, and practically his entire stock and fixtures were set aside for him as exempt. This was precisely the way the debtor had figured it all out—none of his other creditors were pushing him, and there could therefore be no bankruptcy proceedings—but he forgot one possibility. The setting aside of the stock and fixtures exhausted the debtor's claim of exemption, and left the jobber free to take the whole of anything more which he might turn up. The local attorney for the jobber was well acquainted with everybody, and it was an easy matter for him to compile a list of the drygoods' man's chief credit customers. This was done, and an attachment execution was issued against every one, garnisheeing the money which they owed the retailer, and ordering them not to pay it. Altogether about $650 was seized in that way, with more in sight, when the retailer capitulated and made a satisfactory arrangement for settlement. This gives some idea of the possibilities of the proceeding.

Naturally the debtor's bank account can be made the subject of the same sort of attachment execution, as can any money or property belonging to him but in another's hands. In some States, wages due can be attached also, but these States are in the minority; in most States there is no attachment of wages. Under laws of this type, salaries and commissions are practically always classed with wages.

In some cases the use of garnishment proceedings and all other proceedings of the same kind will be interfered with by other creditors, who will come down on the debtor and put him into bankruptcy when they see you going ahead to collect. But in a surprising number of cases the attachment plan can be used if it is thought of at the psychological moment and used quickly.



PRIZE WINNING BELGIAN STALLIONS OF LARGE PROPORTIONS

Thoughts on Timely Topics

By THORNTON

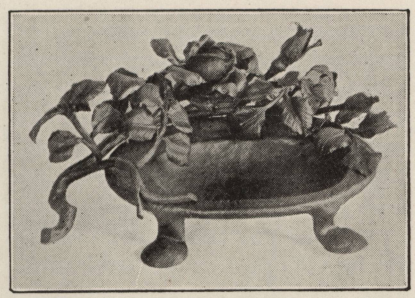
Caustic Censure and Cheery Comment

YES, IT'S A NEW YEAR. What are we going to do with it? Here's a year that we've never seen before; a year that is slick and clean; a year without a blot, spot or good deed. What will it show twelve months hence? Here's a pretty good line of thought for everyone it seems to me. Let us all devote some thought to these points at this time.

THEY SEEM TO BE GETTING down to common sense in some sections of our glorious country—seem to be waking up to the right idea. And what I refer to is the application of modern stock-raising ideas to the raising of children. Yes, sir! Folks are getting some sense at last and they are paying a little more attention to the raising of the human animal. In several fairs during the past fall they've not only held live-stock shows but baby shows as well. And prizes haven't been pinned on

merely the prettiest decorated, but they were awarded according to real merit; same as cows, horses and stock. And, friend, let me tell you it's about time. When folks, generally, will pay as much attention to the raising of a blue-ribbon winning boy or girl as they do to a blue-ribbon Jersey or a Shropshire pig then we'll have sturdier men and women, and fewer mollycoddles and wishy-washy-willies that don't know their own minds from a limousine with cigarette attachment and a high speed clutch. If thousand-dollar stock is worth all the time, trouble and expense usually devoted to it, isn't a fifteen-hundred-dollar boy or girl worth time and trouble and care, too? Let us devote at least as much time to the development of the 100-per-cent boy and girl as we do to the raising of the 100-per-cent critter.

THE AUTOMOBILE REPAIR PROPOSITION seems to be a puzzler to a great many smiths. That is, a great many do not know whether they should take up the work or not. They seem to be on the fence. As one smith said to me the other day: "I don't know whether to go in for the auto work or not. Some smiths say don't and others say do. So I'm pretty much up in the air." As I told this smith it all depends on your own particular case. If you can get automobile work to do, and have space and time or can make space and time for it, by all means do the work. Of course the chances are that at first you won't know a floating axle from a floating kidney, but you've got a better foundation for doing automobile repairing in a workmanlike manner than the average auto-expert who is talking continually about synchronizing the syncopater of the thing-a-ma-bob with the what-you-may-call-em, and who really doesn't know a piece of carbon steel from a lead pipe. And it is really pitiable at times to listen to the ignorance displayed by some of the auto-experts. They leak at the mouth, like an old-fashioned syrup-barrel nozzle, and what they give out as knowledge, is just about as valuable as the drippings from a syrup barrel after they've run over the cellar floor. Some time ago I listened to an auto know-it-all who explained to a group of willing listeners that: "The gears for our cars



ANOTHER EXAMPLE OF MR. CRAN'S WORK

are all case-hardened first in the blank and then cut. We use nothing but pre-hardened cut gears." Of course he didn't mean any such thing at all, but his pre-hardened, copper-riveted dome of infantile intelligence didn't know any better. Don't be afraid of the auto-repair proposition if you can get the work to do. It's profitable, it's easy—and you can get the necessary know from a good collection of books.

SOME FOLKS are working so hard to earn a living that they forget to live.

Around Our Forge Fire

"How'd you know I wanted to see you this morning, Benton?" greeted the Editor as the Recipe Man entered and established himself in his favorite chair.

"I didn't know it," replied Benton. "But seeing you did want me, why I'll just accept a cigar and talk between puffs"; and the man of recipes helped himself to a cigar and after lighting it sat back to enjoy his smoke.

"I didn't want you merely for the purpose of smoking up my cigars," returned the Editor. "I want your help on several matters here, and if you'll get out that recipe book of yours I'll let you know what I want or rather what some of 'Our Folks' want."

Then picking up a letter from a pile on his desk the Editor read: "I am looking for a good cement for stopping leaks. I am working for a company that has a great deal of trouble with leaks in their piping, and a good cement that will harden under water will be of considerable value to me in repairing some jobs temporarily or until the work can be done right." "That is from a reader down in Pennsylvania," finished the Editor.

Benton was busily turning the pages of his recipe book. Finally he stopped: "Here is something that will fit that case like a glove. And one big advantage of this recipe is that it isn't complicated All that is necessary is to secure equal parts of litharge, glycerine and Portland cement and mix them. This cement is good for stopping leaks, it will harden under water and can also be used for cementing brass and glass. Seems to me it would be a good thing to keep handy in a general repair shop, too."

"Here's a man asks about the use of salt for heating pieces to be hardened or annealed. What can you tell him, Benton? I know it is sometimes used" added the Editor, "but what does your book say?"

"Why, I ran across that salt stunt here awhile ago," returned Benton, hunting through the pages of his recipe book. "I made a note of it, too. I think it was Sam Keeton—yes, here's his name to this note. He says he uses the salt bath for heating, and because of its simplicity prefers it to the lead bath. He uses fine salt, places the articles in it and then heats to the desired temperature." Then, continuing, Benton said: "Keeton didn't mention this, but I would think that salt would be an excellent thing in which to anneal steel. For example, suppose the articles were placed in the salt, heated up and then allowed to remain in the solution until cold. Seems to me that would have very near the desired effect."

"Yes, Benton, it sounds reasonable;—suppose you try it out the next time you have a chance," suggested the Editor. Then taking up another letter he said, "Here's an owner of a power shop who wants to know how to make a good belt dressing—something that will not only make his belts pull but will also keep them pliable and prevent slipping."

"There are an almost unlimited number of recipes for belt dressings, but here's one I got hold of the other day from a man who has charge of the belts in a shop down near the river. He recommends it especially as an anti-slip dressing. He takes eight ounces of Venice turpentine, one half ounce of tallow and one ounce of good lard oil. This man says he's been using it for some time with very satisfactory results."

"Here's a man who wants a formula for making a compound to prevent the rusting of machinery. He says that his machines, because of the natural dampness of the air in his locality, are rusting badly, and he wants to know if there isn't something he can put on them."

"Yes, I got a recipe from Bill Cruver the other day," and Benton read from his book. "Take one pound of lard and, after melting it, dissolve one ounce of camphor in it. When all is dissolved skim the dirt from the top of the liquid and add enough fine graphite to give color to the mixture. The machines to which the solution is to be applied are then thoroughly cleaned and the mixture smeared on. After two days rub the machines clean with a soft cloth, and rusting will be prevented for a long time."

"That is just the thing this man is looking for, Benton," complimented the Editor. "And inasmuch as you have come close to passing 100 per cent in our questions this morning, suppose you force another cigar upon yourself and come out and have some lunch."

To all of which Benton heartily agreed.

Wanted: A Job

W. O. B.

[The final completion of the canal at Panama will throw out of existence an organization whose accomplishments sink all other engineering feats into insignificance. The canal builders will be out of a job because there's "no opening" big enough. The work they accomplished, the obstacles they overcame and the repeated and numerous discouragements that seemed but to encourage those toilers of the "ditch" to still greater effort can never be fittingly described.]

Wanted: a job that they say can't be done.
It may have been started or not yet begun.
A job that is tough, a hard nut to crack.
A Gibraltar in jobdom, where problems don't lack.
A corker, a hummer, a slashin' big trick.
A bloomin' ol' buster as hard as a brick.
A teaser with problems as big as the earth,
Where men who are workers can show their real worth.

We found hell loose on the Isthmus—
The demons of death in command
Cut deep in the ranks of the coolies,
Left few of their ditch-diggin' band.
We found piles of bones there a whitenin'
Under the glare of the sun.
But we cleaned up the place
And ran a fair race
With the demons of hell, but—we won.

Wanted: a job, where workers can work,
Where hustle is needed and no one to shirk,
Where something impossible's got to be done,
And graft is taboo, but credit is won.
A job where the face of the earth's to be changed,
Where history's to be made or the map rearranged.
A job where the workers can toil night and day.
Some job that's stumped others despite extra pay.

We made the dirt fly on the Isthmus—
We set up a pace that would kill
The Frenchies or even the others
In cutting down Empire Hill.
We busted all records for diggin',
And eight thousand tons in a day
Was like hummin' a song
For our dirt-diggin' throng.
They'd a-dug thro' t' hell on a say.

Wanted: a job; some big thing t' put through.
Some work the whole world's been trying to do.
A big undertaking as big as the earth.
Where set-backs abound we show our worth;
A job that is dead or maybe not born,
A big proposition—a hope, but forlorn;
A huge undertaking that staggers the land—
The bigger the better for our ditch-diggin' band.

We mussed up the map on the Isthmus;
We changed the whole lay of the land;
Tamed the hills, rivers, lakes and the mountains
Till they fed from out our hand.
We linked the great oceans together—
A cinch for our ditch-diggin' mob—
But now that it's done,
Where under God's sun
Is another such slashin' big job?

Heats, Sparks, Welds

Better shop talk than sharp talk.

Don't lay this paper aside without reading "The Past Year" on the page of "Timely Talks."

Efficiency is the watchword of this century. How about that old scrap-pile lying in the corner?

The blacksmith who *reads* does not look for profits with a microscope—he installs a bookkeeping system.

No man knows all there is to be known about blacksmithing. Let us all get together and learn from each other.

We have horseless wagon, wireless telegraph, painless dentistry, why not more sootless smith-shops?

Any horseshoer can shoe a horse—that's his business—but it takes a horseshoer with brains to shoe a horse correctly and with profit.

The amount of brains—real hard thought—that you put into your work determines the amount of pleasure and profit you will get out of it.

"Better to go to bed having dined on a dry crust than to rise in debt." That wouldn't be so bad, as a "no credit" sign to hang up.

Exposing the skin by clipping the fetlock often causes scratches during the wet season. Long hair at the fetlock is natural—let nature protect the part as intended.

A good time is right now, to get on that Honor Roll. A ten-year subscription will save you half your subscription money and put your name right up amongst the leaders.

The successful blacksmith is the one who can and will make use of the experience of others—who has the courage to discard his own errors and to profit by the truths of others.

Let us know just exactly what you think of our new headings. Styles in printing change, as well as in dress, and this is just about the newest idea. How do you like it? We must keep up to date—and there's nothing too good for THE BLACKSMITH.

"It's better to pound an anvil and make a good horseshoe than to pound a pulpit and make a poor sermon." Be continually striving to make a *better* shoe, or a better vehicle. By conscientiously observing your work you can make the best.

"Money begets money, and its offspring begets more," said Ben Franklin, but he didn't say a word about putting money into wild-cat schemes or get-rich-quick ventures. Many foolish persons have closed a bank account by putting their money somewhere else, in the hope of getting rich quickly. "Better be safe than sorry."

Electricity is used for many purposes, but perhaps the most curious use for the current is that of aging cheese. An electrician of Holland has discovered that during a period of 24 hours he could age a perfectly fresh cheese. A fresh cheese after being subjected to an alternating current for 24 hours shows all the consistency, taste and appearance of a fine cheese that has been stored and carefully treated for two years.

The first lightning rod was not invented by Ben Franklin, contrary to popular belief. The first rod was invented by a poor monk in Bohemia. He put up the first lightning rod in June, 1754. But his enemies, jealous of his success, incited the neighboring peasants against him, and under pretext that the rod was the cause of the excessive dry weather they had the rod taken down. The inventor was imprisoned.

"The horse is still with us," says The Pioneer Pole and Shaft Company, referring to a clipping from the *Chicago Tribune* showing a compilation of one day's traffic in the downtown streets. According to these figures, the total number of horses counted on eight downtown streets during one day of 1913 was 22,480, while in 1907, 24,249 were counted in one day. The number of automobiles on the same streets amounted to 1,103 in 1907 and to 7,398 in 1913. This seems to show that the horse "ain't went yet."

A Suggestion

Do your accounts account?

Do you know your business as you should?

If not, is this not a good time to begin—to make your books valuable assistants and contributors to your success rather than the bugbear of your business?

THE AMERICAN BLACKSMITH is always ready to assist you to make more money.

An oil well opened at Baku, Russia, while a success, ruined the company because of the damage it caused. The oil strata was suddenly tapped at a depth of 570 feet. With a roar that could be heard for miles the gas blew off. A terrific blast of oil followed the gas after some minutes, blowing the derrick into the air, and a jet of oil and sand rose 200 feet. For two months this monster flowed unchecked, the oil forming lakes and rivers, until it is estimated five million dollars' worth of fluid had gone to waste. Government engineers were finally appealed to and after much unsuccessful work they finally succeeded in capping the well.

There was trouble enough and to spare over at Friend Tardy's the other day. It seems that Tom had gone to the corner wet-goods emporium, and while he was away the scrap-man called. He looked 'round a bit, weighed up a small pile of old shoes and then proceeded to clean up the shop. He had just gotten the old anvil, the rusty drill press and two old vises into his wagon when Tom returned. The air was blue for several minutes and Tom was hopping mad. But the scrap-dealer said he guessed he knew his business and he certainly knew scrap and junk when he saw it. But, of course, Tom wouldn't sell the stuff, though goodness knows the tools are old enough to be retired.

Our Honor Roll

Fifty-Two

Fifty-two new names were placed on "Our Honor Roll" this month. And two of those names jumped right up into the 1924 class. But there is still plenty of room at the top, and the 1924 class is easy to get into. For example: if your subscription expires this month—January—send $5.00 ($7.00 from Canada or 1£ 14 sh. in other countries) and we will give you ten full years' credit; mark you, paid up to January, 1924, and place your name on Our Honor Roll right up among the leaders. Just notice the saving you can make.

	U. S. and Mexico		Canada		Other Countries	
2 yrs.	$1.60	save $ .40	2.00	save $ .50	10 sh.	save 2 sh.
3 yrs.	2.00	save 1.00	2.70	save 1.05	14 sh.	save 4 sh.
4 yrs.	2.50	save 1.50	3.20	save 1.80	18 sh.	save 6 sh.
5 yrs.	3.00	save 2.00	3.75	save 2.50	1 £	save 10 sh.
10 yrs.	5.00	save 5.00	7.00	save 5.50	1 £ 14 sh.	save 1 £ 6 sh.

Send your order and remittance now—today. Don't wait until you forget all about it. You'll never regret it. Our subscription insurance saves you money. The sooner you begin saving the more you save. There is no time better than NOW.

NAME	Subscription Paid to
W. C. Watt, Kan.	Dec., 1930
Waddington Farm, W. Va.	Mar., 1928
I. J. Stites, N. J.	Jan., 1928
A. Bosch, N. Y.	Mar., 1924
F. Jacobs, Ohio	Feb., 1924
E. H. Troyke, Ill.	Dec., 1923
J. Bailey, Man.	Dec., 1923
F. Watkins, N. H.	Nov., 1923
W. B. Abell, N. Y.	Oct., 1923
W. R. Turner, Man.	Oct., 1923
C. Nelson, Neb.	Sept., 1923
O. W. Taylor, Pa.	Aug., 1923
S. Effenaar, S. Africa	July, 1923
G. L. DeWitt, Mont.	July, 1923
W. W. Gregg, Tex.	July, 1923
O. C. Young, Mich.	June, 1923
Otto Sippel, Penn.	June, 1923
A. Chapman, N. Y.	June, 1923
C. Birely, Md.	June, 1923
F. H. Shupe, Penn.	June, 1923
J. C. Stover, Penn.	Apr., 1923
W. Schoonover, Penn.	Apr., 1923
J. B. Runmire, Iowa	Mar., 1923
Lownsdale Bros., Mo.	Mar., 1923
J. Carswell, Ark.	Mar., 1923
G. E. Glazier, Ohio	Mar., 1923
T. Bradley, N. S. Wales.	Mar., 1923
I. T. Needham, Ill.	Feb., 1923
G. C. Disinger, Miss.	Feb., 1923
J. Hughes, Ohio	Feb., 1923
J. Wieber, Minn.	Jan., 1923
Z. A. Enos, Kan.	Jan., 1923
W. G. Wise, Cal.	Jan., 1923
F. S. Bishop, S. Africa	Jan., 1923
S. P. Harney, Mont.	Dec., 1922
W. Breckner, Okla.	Dec., 1922
J. Pabian, Neb.	Dec., 1922
P. Fredericksen, Iowa	Nov., 1922
L. O. Leiurs, Ill.	Nov., 1922
W. Lawson, N. Z.	Nov., 1922
W. H. Miller, Iowa	Oct., 1922
A. O. Martin, Idaho	Sept., 1922
O. A. Mortimore, Idaho.	Sept., 1922
H. J. Wyatt, Wash.	Sept., 1922
J. N. Skow, Iowa	Sept., 1922
A. D. Standiford, Wash.	Sept., 1922
T. Temkiewiez, Que.	Sept., 1922
A. Pfeiffer, Ohio	Aug., 1922
W. D. Valentine, Iowa	Aug., 1922
G. Hoffman, N. Y.	July, 1922
J. Erman, Ark.	July, 1922
W. K. W. Hansen, Pa.	June, 1922
Robert Tochter, Cal.	June, 1922
J. Van Marter, N. Y.	June, 1922
E. Anders & Son, S. Aus.	May, 1922
Louisa Carriage Wks., Va.	May, 1922
S. Smith, Tex.	Apr., 1922
J. W. Haar, La.	Mar., 1922
E. A. Dillon, Nev.	Mar., 1922
D. W. Smith, R. I.	Mar., 1922
D. F. Kuster, Wash.	Mar., 1922
G. F. Johnson, Mich.	Feb., 1922
R. H. Keith, Iowa	Jan., 1922
O. M. Johnson, Minn.	Oct., 1921
H. Feldus, Neb.	Sept., 1921
W. K. Kline, Kan.	May, 1921
F. Norrie, Yukon Ty.	Jan., 1921
J. L. Jester, Mo.	Jan., 1921
R. S. Crisler, Ky.	Jan., 1920
Ed. Grimm, Tex.	Mar., 1920
T. P. Consodine, Mass.	Dec., 1920
R. Ramach, N. W. Ter.	Nov., 1919
J. Naismith, N. Zealand	Nov., 1919
F. Underwood, S. Africa.	Aug., 1919
Theo. Paschke, Neb.	Apr., 1919
I. M. Townsend, Cal.	Apr., 1919
G. Bish, Fiji Islands	Apr., 1919
C. Williams, W. Aus.	Mar., 1919
R. Taylor, N. Zealand	Feb., 1919
G. E. Hardcastle, N. Y.	Nov., 1918
W. Vallance, N. Y.	Nov., 1918
C. Ziehe, Iowa	Nov., 1918
Cyclone Gate & Fence Co., S. Africa	Oct., 1918
W. Alson, Minn.	Oct., 1918
H. P. Bowerman, N. D.	Oct., 1918
J. Delane, Neb.	Oct., 1918
J. F. Baggett, Queens.	Sept., 1918
P. J. Thorneycroft, N. W. Ter.	Sept., 1918
W. A. Thuge, Queens.	Sept., 1918
A. L. Varrie, S. Africa	Sept., 1918
Geo. A. Petty, Utah	Sept., 1918
G. W. Hazlett, Pa.	Sept., 1918
C. Walter, Ore.	Sept., 1918
T. B. Holt, Okla.	Sept., 1918
Robert Cook, Ky.	Sept., 1918
A. B. Wendlandt, Wash.	Sept., 1918
A. J. Brookman & Co., Vic.	Sept., 1918
Peter Cocks, W. Aus.	Sept., 1918
R. J. Tompkins, Texas	Sept., 1918
J. Vaschetti, Colo.	Aug., 1918
E. C. Puxton, So. Aus.	Aug., 1918
V. D. Sibley, B. C.	Aug., 1918
L. Smith, Cal.	Aug., 1918
W. Cribb, Queensland	Aug., 1918
Geo. Reid, S. Africa	Aug., 1918
H. Kelenbenz, N. J.	Aug., 1918
W. D. Bradford, Cal.	Aug., 1918
A. Discher, Aus.	Aug., 1918
Gilbert Bros., S. Aus.	July, 1918
A. Mackenzie, W. Aus.	July, 1918
Geo. Dash, N. Zealand	July, 1918
C. R. Oliver, S. Africa	July, 1918
L. G. Reid, S. Africa	July, 1918
W. M. Puryear, Ala.	June, 1918
Thom & Verstee, S. Africa.	June, 1918
L. Lacaste, Que.	June, 1918
Wright & Son, Texas	June, 1918
Albert Mellum, N. D.	June, 1918
J. Lindsay, S. Africa	June, 1918
J. H. Gibbs, S. Africa	June, 1918
W. W. Bridges, Ark.	June, 1918
Matheson Bros., Iowa.	May, 1918
Ed. Holland, Queens.	May, 1918
H. L. Haswell, N. C.	May, 1918
E. Koepke, Wis.	Apr., 1918
J. H. Martin Mfg. Co., Ind.	Apr., 1918
H. S. Wayne, S. Aus.	Apr., 1918
H. S. Yongue, Wash.	Apr., 1918
W. Wellhausen, N. D.	Apr., 1918
W. H. Chipman, Mo.	Apr., 1918
A. P. Strobel, N. Y.	Apr., 1918
E. H. Alberty, Pa.	Apr., 1918
J. R. Jeffries, Pa.	Apr., 1918
R. Colvin, Ind.	Apr., 1918
J. Lippert, Ill.	Apr., 1918
Otto Tietz, S. Africa	Apr., 1918
Fla. Ag. & Mech. Col.	Mar., 1918
J. V. Fish, Ill.	Mar., 1918
H. J. Fisher, Mich.	Mar., 1918
Geo. Smith, N. Z.	Mar., 1918
Aug. Holznagel, Ore.	Mar., 1918
A. E. Uehling, Wis.	Mar., 1918
J. C. Young, Pa.	Mar., 1918
D. C. Houck, Ohio	Mar., 1918
John Eyre, Neb.	Mar., 1918
J. S. Staples, Ohio	Feb., 1918
S. J. Boyd, Idaho	Feb., 1918
J. Molitor, Ill.	Feb., 1918
F. P. Fellows, N. Y.	Feb., 1918
J. W. Steadman, Ohio	Feb., 1918
J. P. Holzapfel, Penn.	Feb., 1918
E. N. Gates, Vic., Aus.	Feb., 1918
Renton Wagon Wks., Wash.	Feb., 1918
Whiting Fdy. Equip. Co., Ill.	Feb., 1918
J. P. Koenigs, S. Dak.	Feb., 1918
Richard Brenner, Tex.	Feb., 1918
W. F. Hill, N. C.	Feb., 1918
P. Shirmmin, Cal.	Jan., 1918
J. B. Bettel, Me.	Jan., 1918
W. Miscable, Queen, Aus.	Jan., 1918
S. Portelance, Que.	Jan., 1918
D. C. Foley, Cal.	Jan., 1918
Gleason Bros., La.	Jan., 1918
C. E. Krug, Wis.	Jan., 1918
G. E. Woodard, Kan.	Jan., 1918
P. J. Dally, W. Aus.	Jan., 1918
J. Morrow, Pa.	Jan., 1918
G. M. Seymour, Ill.	Dec., 1917
J. Templeton, Scotland	Dec., 1917
F. Procter, Tas.	Dec., 1917
J. G. Johnson, Ill.	Dec., 1917
F. E. Eglers, Ohio	Dec., 1917
C. T. Forrest, Cal.	Dec., 1917
Theo. Bush, N. Y.	Dec., 1917
J. T. Elliott, Ill.	Dec., 1917
J. Voelpel, Ill.	Dec., 1917
W. J. Main, Cal.	Dec., 1917
J. G. Lauer & Sons, Mo.	Dec., 1917
Mess Bros., Victoria	Dec., 1917
E. Bloomer, Aus.	Dec., 1917
H. P. Adamson, N. Zealand.	Dec., 1917
G. E. Bartell, Wash.	Nov., 1917
F. Froehlich, Tex.	Nov., 1917
J. A. Shepard, N. Y.	Nov., 1917
McMillan, Head & Co., S. Africa,	Nov., 1917
C. Andersen, Queens.	Nov., 1917
J. Kilgour, Scotland	Nov., 1917
F. R. Tomlinson, Kan.	Nov., 1917
Kaye & Ainley, Eng.	Nov., 1917
T. H. Ziegler, Wis.	Nov., 1917
Scholler Bros., Ind.	Nov., 1917
E. M. Wurster, Mich.	Nov., 1917
S. Z. Frey, Ind.	Nov., 1917
B. A. Steinke, Ohio	Nov., 1917
J. N. Bathgate, N. Dak.	Nov., 1917
W. H. Houghton, Pa.	Nov., 1917
G. W. Booze, La.	Oct., 1917
C. R. Walters, Ill.	Oct., 1917
S. Smith, S. Aus.	Oct., 1917
W. Stephen, Queens.	Oct., 1917
W. T. Cutkomp, Iowa	Oct., 1917
Geo. Potschke, Mo.	Oct., 1917
J. W. Raps, N. Y.	Oct., 1917
W. C. Roney, Pa.	Oct., 1917
J. N. Miles, Ky.	Oct., 1917
Emil Plath, N. D.	Sept., 1917
F. Staub, Ohio	Sept., 1917
B. T. Larson, Minn.	Sept., 1917
H. Schoonover, N. Y.	Sept., 1917
Perfection Spring Co., O.	Sept., 1917
W. A. Wilson, N. Z.	Sept., 1917
R. Ross, N. S. Wales.	Sept., 1917
I. E. Sproud, Me.	Sept., 1917
Fred. Blohm, Tex.	Sept., 1917
R. E. Mattox, Va.	Aug., 1917
C. T. Wood, Kans.	Aug., 1917
Geo. B. Heaton, N. J.	Aug., 1917
Clark & Fauset, Queens.	Aug., 1917
C. L. Hockett, Cal.	Aug., 1917
H. C. Stenzel, Tex.	Aug., 1917
M. DeJager, S. Africa	Aug., 1917
F. Howard, Kan.	Aug., 1917
H. Ferrel, Ill.	Aug., 1917
J. McMeeken, N. Z.	Aug., 1917
F. H. Gierke, S. Aus.	Aug., 1917
A. L. Pittenger, Ill.	Aug., 1917
F. Spinks, England	July, 1917
J. P. Kelly, Md.	July, 1917
F. G. Stone, S. Africa.	July, 1917
H. J. Devonshire, N. Z.	July, 1917
V. J. Hubbard, N. Y.	July, 1917
J. C. Skinner, Vict.	July, 1917
A. Fassnacht, Tenn.	June, 1917
H. A. Cheever, N. H.	June, 1917
D. Shafer, N. Y.	June, 1917
W. R. Gelling, S. Africa.	June, 1917
J. H. Bakeberg, S. Africa.	June, 1917
A. R. Hallenbeck, N. Y.	June, 1917
F. C. Bock, Neb.	June, 1917
W. S. Sullivan, La.	May, 1917
H. Smith, Queensland	May, 1917
P. Vanderheaghen, Mich.	May, 1917
Yost & Halvorson, Minn.	May, 1917
W. McCoy, Kan.	May, 1917
A. Guettler, Tex.	May, 1917
C. F. J. Lorenz, N. Y.	May, 1917
A. Datwyler, Ohio	May, 1917
E. T. Hogman, Conn.	Apr., 1917
O. F. Matson, Utah	Apr., 1917
F. Pettit, Okla.	Apr., 1917
H. G. Marriott, Utah.	Apr., 1917
E. Thibaudeau, Wis.	Apr., 1917
W. Pickering, S. Africa	Apr., 1917
Ed. Burrows, England	Apr., 1917
L. Kausch, Wis.	Apr., 1917
J. M. Brown, Tex.	Apr., 1917
P. Pfeiffer, Ore.	Mar., 1917
W. Watson, Vic.	Mar., 1917
W. Bagley, Mass.	Mar., 1917
B. E. Campbell, Mass.	Mar., 1917
P. Ruffer, Ill.	Mar., 1917
G. Stanske, Wis.	Mar., 1917
W. H. Miller, Mo.	Mar., 1917
J. C. Woods, W. Aus.	Mar., 1917
C. Boulton, N. S. Wales.	Mar., 1917
C. A. Hawkins, Ore.	Mar., 1917
A. L. Monycott, W. Va.	Mar., 1917
J. Peterson, Ia.	Mar., 1917
J. Anderson, Tas.	Mar., 1917
A. J. Neill, Vt.	Mar., 1917
Ed. Deitrich, Ind.	Mar., 1917
Lewis Chase, N. Y.	Mar., 1917
E. O. Lee, S. Dak.	Mar., 1917
S. Stemple, Ohio	Mar., 1917
R. S. Gugisberg, Kan.	Mar., 1917
J. S. Haskell, Col.	Mar., 1917
W. L. Roark, Tex.	Mar., 1917
A. R. Barlow, Tex.	Mar., 1917
C. A. Whitacre, Ohio	Mar., 1917
B. P. Carney, Ill.	Mar., 1917
T. J. Dorsey, Conn.	Feb., 1917
F. Marsh, Mich.	Feb., 1917
J. H. White, N. H.	Feb., 1917
McGowan Bros., N. Y.	Feb., 1917
J. W. Haught, Ill.	Feb., 1917
Irving Bros., N. Y.	Feb., 1917
W. H. Schene, Neb.	Feb., 1917
A. J. H. Wegener, S. Africa	Feb., 1917
H. Schnette, Ill.	Feb., 1917
E. Doughman, Ohio	Feb., 1917
Chas. F. Giese, N. Mex.	Feb., 1917
M. E. Goller, Pa.	Feb., 1917
J. Potthoff, Neb.	Feb., 1917
G. M. Garety, Mich.	Feb., 1917
Ernest Finley, Pa.	Feb., 1917
A. Tillman, Cal.	Feb., 1917
Walker Bros., N. Z.	Feb., 1917
G. W. Whittington, W. Va.	Feb., 1917
J. H. Hoyle, S. Africa	Feb., 1917
F. Roschy, Pa.	Feb., 1917
August Millet, Ill.	Feb., 1917
C. P. Robertson, S. Africa.	Feb., 1917
O. Danneman, Minn.	Jan., 1917
S. Hetem, S. Africa	Jan., 1917
G. A. Gurley, Ore.	Jan., 1917
F. K. Wade, Me.	Jan., 1917
L. V. Senn, Neb.	Jan., 1917
S. H. Austin, N. Y.	Jan., 1917
H. Kahl, Ia.	Jan., 1917
J. H. Bergen, Kan.	Jan., 1917
F. G. A. Williams, S. Aus.	Jan., 1917
J. G. Bauer, N. D.	Dec., 1916
J. Classen, Ore.	Dec., 1916
J. C. Crann, Va.	Dec., 1916
T. J. Decker, Va.	Dec., 1916
G. Forest, Mass.	Dec., 1916
A. E. Hamloth, Ore.	Dec., 1916
A. E. Higbee, Ind.	Dec., 1916
M. Jago, N. J.	Dec., 1916
Koger Pea & Bean Thresher Co., Tenn.	Dec., 1916
G. Jones, Ore.,	Dec., 1916
L. Maier, Neb.	Dec., 1916
A. F. Middlebrandt, Mich.	Dec., 1916
J. B. Nix, Ill.	Dec., 1916
G. H. Parker, N. H.	Dec., 1916
A. H. Perganda, Ill.	Dec., 1916
W. A. Reagan, Pa.	Dec., 1916
G. Schenk, Okla.	Dec., 1916
J. C. Smith, Wash.	Dec., 1916
N. Tombley, Minn.	Dec., 1916
L. R. Virden, Colo.	Dec., 1916
E. Willis, Colo.	Dec., 1916
E. E. Trine, Pa.	Dec., 1916
B. S. Casey, Mass.	Dec., 1916
W. Denser, Mo.	Dec., 1916
J. B. Scheidler, Ind.	Dec., 1916
F. Kummer, Ohio	Dec., 1916
Alfred Cass, N. Z.	Dec., 1916
H. Grimm, Utah	Dec., 1916
A. H. Gooding, S. Aus.	Dec., 1916
Leonard Smith, N. J.	Dec., 1916
C. F. Shaw, Man.	Dec., 1916
W. Elward, Pa.	Dec., 1916
W. W. Egly, Pa.	Dec., 1916
Jos. Boyer, Mich.	Dec., 1916
J. Williams, N. S. Wales.	Dec., 1916
J. H. W. Schneider, Cal.	Dec., 1916
W. Sauer, Minn.	Dec., 1916
F. F. Darling, Cal.	Dec., 1916
Chas. Newland, Cal.	Dec., 1916
J. T. Brahm, Ia.	Dec., 1916
P. H. St. Louis, Wis.	Dec., 1916
A. E. Nickols, Okla.	Dec., 1916
C. J. Hall, Wash.	Dec., 1916
Bob Fricke, Ala.	Dec., 1916
Joeris Bros., Tex.	Dec., 1916
R. Clemens, Conn.	Dec., 1916
Scheffley & Schmitt, Pa.	Dec., 1916
A. Brause, Ohio	Dec., 1916
J. E. Beatty, Mo.	Dec., 1916
Geo. Cassie, Scotland	Dec., 1916
John Kain, Ky.	Dec., 1916
F. W. Howell, Ill.	Dec., 1916
J. Robertson & Son, Scot.	Dec., 1916
G. C. Beers, N. Y.	Nov., 1916
W. Bracken, Minn.	Nov., 1916
C. Fredenburg, N. Y.	Nov., 1916
F. Kolarik, Ia.	Nov., 1916
G. Kugler, Neb.	Nov., 1916
E. J. Manion, N. Y.	Nov., 1916
J. Mason, Ill.	Nov., 1916
J. R. Morehouse, Cal.	Nov., 1916
G. Rayman, Ind.	Nov., 1916
J. R. Walker, Ind.	Nov., 1916
J. Carter, Pa.	Nov., 1916
G. E. Deidrick, N. Y.	Nov., 1916
W. H. Harding, Neb.	Nov., 1916
J. Meier, Minn.	Nov., 1916
Z. N. Reed, Wash.	Nov., 1916

The Seeker Is the Receiver

ELBERT HUBBARD

We live in an age of investigation and interrogation, hence the success of the man who furnishes the truth and those who absorb it.

We are beginning to see into and through things, and it's a case "if you don't see what you want, ask for it"—that's right. If you get more than you want of the wrong sort, that's right, too—it's a part of your education!

The boot has boosted many a man—some folks need firing to fire their imagination.

And when you have no imagination and no initiative, you are led—also lead—you don't radiate.

It is this imagination, fancy, gift of visioning, that spells success. The dreamers are the workers.

"I could be bounded in a nutshell were it not that I have had dreams," said Hamlet.

The reason we see so many peanuts in politics and in business is because their imagination is *only* limited to the cash register, their vision confined to the tape machine.

A man who wants to know the whyness of the wherefore or the thusness of the this, is in the line of evolution—of advancement.

Anybody can make a statement, but to "show cause" is another proposition.

And the fellow who makes it his business to go around poking "whys?" into everybody's affairs is sure to get some nasty jars and jolts.

He must know how to guard as well as punch—to answer the "whys?" as well as to ask 'em.

There are three ways to attain knowledge: "To ask, to be told, to find out for yourself."

And not one of these processes alone can give you knowledge. They must be used in combination. You must be a seeker, a learner, and a doer.

No man lives to himself alone—we are part of all we have met.

The man who asks gets to know. The man who, when told, takes notice—grows. The man who works, wins.

His imagination, investigation and interrogation give him inspiration—the inspiration born of usefulness.

He stands erect upon his feet, stretching forward to seize every opportunity for advancement.

Our prehistoric ancestors, before the formation of language, used to make known their wants by signs. But with the growth of centuries, language of speech was evolved, and men began to hide their real feelings under a cloak of phrases, and not a few to lie like some sophisticated lawyers.

Then came the printing press, the phonograph, moving pictures, osteopathy, and the player-piano.

All these things are the outcome of the eternal query, "why?"—the result of imagination, interrogation, investigation and work.

They are educators.

And the Trade Paper is probably the most alive to the urgency of education, and the gratification of the mental needs of its readers, than any other press production.

It asks, absorbs, gives.

Look at this paper—note the logic of its discussions, the well-expressed opinions of its contributors, the quality and texture of the paper, the clearness of the type, the beauty of its arrangement. Then tell me if it isn't an education—beautiful, inspiring, strengthening.

Thousands of Trade Paper subscribers are receiving mental uplift and renewing their courage by its means.

The Trade Paper is the leader, the reflector of the Trade World.

It helps you push business, thereby preventing nervous prostration. For nervous prostration is never occasioned by you pushing your business—it only happens when your business pushes you.

It gives vivid character sketches of the passing great. It takes extensive tours over the fields of science, business and invention. It teaches by living, moving word-pictures the reasons for the failures and the causes of success.

The business of religion is now giving place to the religion of business; and the trade paper is the evangel of the true brotherhood of co-operation and self respect.

Show me the company a man keeps and I will tell you what he is.

Show me a man who subscribes to and reads his Trade Paper faithfully and you show me a man who will "show ME,"—a man alive, alert, ambitious, successful.

He has learned to ask, to seek, and to find. The Trade Paper is his guide, his encyclopedia, his friend.

HE is the WHY of the Trade Paper, and the Trade Paper could not exist otherwise.

The Trade Paper, specialized and classed, supplies him with mental uplift, increases his sum of knowledge, places him in touch with men and things. It is a cathartic, a tonic, and a developer.

And the Trade Paper subscriber in turn provides the gist.

Go to school to the men who know how.

The WHY of the Trade Paper is CO-OPERATION—the greatest force in the world today.

It exemplifies unity of purpose, of endeavor, of achievement. The getting together, holding together and pulling together—the elimination of imperfections and the materializing of ideas and ideals.

SUBSCRIBE FOR AND THOROUGHLY READ YOUR TRADE PAPER.

The Meeting of the Kansas Association

Mr. Austin English, Secretary-Treasurer of the Blacksmiths', Horseshoers' and Wagonmakers' Association of Kansas, reports that the meeting at Salina, November 12-13, was the best in every way that was ever held by the Kansas Association; and that is saying a great deal. The officers elected for the coming year are T. F. Lannan, President; W. C. Johnson, Vice-President; and, of

course, Austin English in the Secretary-Treasurer job. The Executive Board for 1914 will be made up of G. A. Millar; Ed. Bohrer and C. W. Anderson. The Committee on Organization are C. L. Cribbs; Ed. Forney; Perry R. Buckley; J. C. Harris and W. C. Johnson.

The next annual meeting will be held at Wichita and it is expected to do something toward the formation of a National Organization.

A Government-Shop-Built Delivery Wagon

M. A. FOSTER

This wagon was built by the writer in the Government Shop at Fort Logan. The dimensions given and the description may assist other readers who want to build an especially sturdy vehicle that will stand the hard usage to which these government vehicles are subjected.

The Gear

First we will take the gear. Every piece of timber that went into this part of the job was selected hickory.

The axles used were 1⅜ inch and of the patent type. The rear axle was made straight, while the front axle was considerably arched in order to level up the body when finished.

The reach was 1¾ inch square and ironed both top and bottom, as we used only a single reach with two brace irons from each side to the rear axle. Some wagons of this style have wood hounds in rear; we used two iron braces instead. I think this makes a much better job than the wood hounds.

The wheels on this job are the Sarven patent with 1⅜-inch tires.

The Body

The body was built 8 feet, 6 inches in length. This is a little longer than the ordinary body of this type, but the use to which the wagon was to be put required this length. The sills are 1⅜ by 2¾ inches, cut out of selected ash. While the sills are mortised into the rear crosspiece they were lapped on the front cross or endpiece. The crosspiece near the center is bolted onto the bottom of the sills. This makes a better job than to mortise into the sills, as the ends extend out far enough to admit a body brace. The frame of the body consists of five upright posts on each side, cut from selected ash, with two rails lengthwise of white oak to form the panels. The panels were made of ½-inch poplar with a substantial hardwood rail on top. The front end was paneled the same as the sides. The end was fitted with a drop gate.

The Top

The top was a built-up top, without using any bows. The posts or stanchions are 1 by 1¼ inch. This was selected ash and fitted with a rail at the top for the ribs to rest on. The ribs are 1 by 2 inches when finished, and were cut from selected ash. The ribs were first fastened in place on top of the side rails at the top of the stanchions by screws. They were then secured by being braced with iron.

Strap bolts were made to reach from the bottom sill to the top of stanchion, and were put through the sill the same as any common strap bolt in a farm wagon.

The top panel is fastened to the stanchions, is 8 inches wide and is fastened in place by rivets passing through panel, stanchion and strap bolt.

Poplar top slats, ⅜ by 2 inches, were used on the ribs to receive the canvas. After the canvas was put on, a clover leaf molding was added all around the edges and also up each stanchion. This formed a panel appearance of the side canvas. Roll-up curtains were placed at each end of driver's seat and are 22 inches wide.

The rear end is provided with two iron doors which are hinged to the rear stanchion and are fastened with a strong lock.

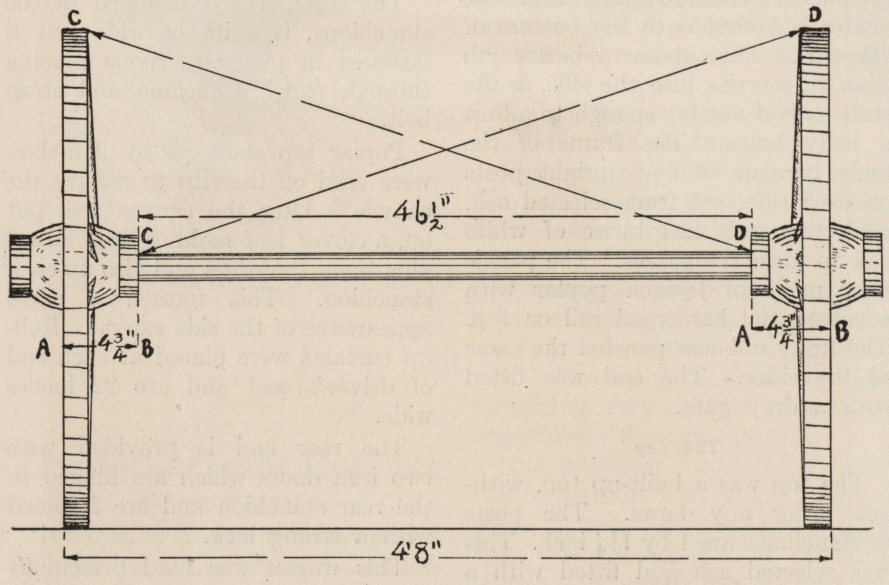
This wagon was used principally for delivering packages of all descriptions from Denver to Port Logan.

The painting of the vehicle consisted of a vermillion red gear, while the body was a dark green, except the panels which were the same as

WAGON BUILT BY MR. M. A. FOSTER IN THE GOVERNMENT SHOP AT FORT LOGAN

the gear. The wagon was ironed off by Mr. Franz Wenke, a very able smith with whom readers of THE AMERICAN BLACKSMITH are already acquainted.

I don't think it policy to give measurements in all particulars, as this is a heavier wagon than is generally used in civil life. I have built and repaired wagons for the government for the last ten years, and I find that I have to make every job much heavier and stronger than a job that is used in civil life, on account of the hard usage to which it is put. I have seen the ordinary delivery wagon turn over and the top crush to pieces, but a top built like this one can be upset without much danger of being broken. I presume that most wagon builders in civil life think that Government Shops are fully equipped with all modern machinery, tools and supplies of all kinds to work with. This is decidedly a mistake. When we build a job as mentioned we have to make it up out of just what happens to be on hand, and invariably we have to substitute all the way through the job.



MR. PETERSON EXPLAINS HOW TO MEASURE AXLES

The Length of Front and Hind Axles

NELS PETERSON

In the November issue, Brother W. E. Riffe inquires the proper length of front and hind axles, but does not state whether he means wood or steel axles. If it is steel axles upon which he desires information I can explain some of my experiences or method in getting the proper length. Of course, the method for getting the length of any axle is the same, regardless of the width of the track used in different localities. There are three different widths; narrow, standard and wide track, and they measure as follows:

Narrow track, 4 feet 4 inches
Standard track, 4 feet 8 inches
Wide track, 5 feet.

In some cases the length of the axle depends on the width of the body, regardless of the track. Where the body is unusually wide the axle must be long enough to allow the body to hang between the wheels without striking. In either case the measurement is from out-to-out of the rim on the floor.

To get the length of an axle for a 4-foot 8-inch track, and which is the most commonly used, it is obvious that the length of the hub must be taken into consideration. For instance, a pair of wheels with 6-inch hubs must, of necessity, require a longer axle than wheels with 12-inch hubs. A 1¼-inch axle usually has a 7-inch or 7½-inch spindle. Taking this as a basis we start by measuring the hub from the face of the spoke to the butt end of the hub which we find to be 4¾ inches, as shown in accompanying engraving at A and B, and twice 4¾ inches equals 9½ inches. Therefore the width of the track required is 56 inches, and 56 inches less 9½ inches leaves 46½ inches which is the proper length between the collars of the axle. In this case, the hub being ½ inch longer than the spindle, the boxing is driven in until it is flush with the face end of the hub, thus leaving ½ inch for the collar to be sunk in at the butt end.

In setting the axle, the spoke of the wheel should be made to stand plumb, that is, the measurement from out-to-out of the rim on the floor will correspond with the width from out-to-out of the spokes at the hub. When both ends of the axle are set under the same amount, and to ascertain this fact, take the measuring rod and measure from the collars to the top of the rims as shown in engraving from C to D. If these are alike, the two spindles are set under the same amount, provided, of course, the wheels have the same amount of dish. The axle should have a little forward gather, also, of about ½ inch narrower in front, on account of the taper of the spindle. The most accurate way as well as the quickest for setting an axle is to use an automatic axle gauge which can be secured for the small sum of $5.00, but will repay its cost in a short time if you have any amount of axle work to do.

If there is any further information desired or if my explanation is not entirely clear or not exactly to the point I shall be very glad to give any further information on the subject that may be desired.

From Discounting Notes to Discounting Bills

When Joe Bigelow, proprietor of the Bigelow Shop, walked into the Chandler County National Bank he felt like a dark-gloomy day which threatened rain; and when he walked out he felt like a rainy Sunday after a two-weeks steady downpour; for while he had gone to the bank for help, for salve to ease his troubled brain, he met with the reverse, which merely multiplied his troubles and increased his worry.

Joe Bigelow had started in Chandlerville some four or five years ago. He was a good mechanic, had a bit of money and he equipped a good shop. In the enthusiasm of owning his own business, Joe pushed things with all his ability and for two or three years prospects seemed to be especially bright and promising. After

a time, however, he considered his business pretty well started toward success and also that his time for taking things a bit easier had arrived. Accordingly he left matters pretty much to his help until he got down into the rut which eventually claims most men who are flushed by apparent success. This attitude toward his shop and business soon placed Bigelow where he must have aid from the bank. He accordingly succeeded in placing a note with the Chandler County National who gladly extended the accommodation on what they considered a live and growing business. But when Joe Bigelow came with a second note which he desired to discount the bank instead of appearing in the guise of a friend and helper, looked like a marble statue clad in gauze on a winter's morning with the mercury at twenty below. For before Bigelow left the cashier's window he was advised that not only did the bank refuse to discount the new note but the other one must be paid just as soon as due. "We cannot renew it, Mr. Bigelow," said the cashier. "Our committee had your account up for attention at the last meeting and on considering the latest report you made to the bank they do not feel that they can renew your note."

Failure—was written on Joe Bigelow's face after his talk with the cashier. His heart and head felt as though being gripped in a vise while the handle was being slowly but surely turned and the jaws slowly closing in. Never before had he considered himself a failure. But now, with five men hard at work in a well-equipped shop, he must brand himself as a failure, not merely unsuccessful, for had he not been mounting the upgrade since he opened in Chandlerville—had he not a goodly force of good men and machines working for him? Yet he had failed—failed shamefully—failed in the very face of success—failed at the very threshold of his goal. Why?

These were his thoughts as he plodded slowly shop-ward from the bank. These were his questions as he attempted to solve the problem. As he entered the shop the very whir of the machines seemed to mock him—the pound of the power-hammer seemed a laugh at his disgrace and humiliation.

Mechanically he turned to the safe, took his business books from its depths and sat at his desk to figure a way out of his difficulties. He must get cash immediately to meet his bills and to meet the note held by the bank. He glanced over account after account in a search for possible collections. But those customers owing him any considerable amounts had already explained why they could not pay, while those who could have paid had little or nothing charged to their accounts. An examination of his bank book showed that little comfort was to be gained in that direction. His total cash on hand, in bank and in accounts that could be reasonably considered sure, would barely meet one tenth of his total indebtedness, including the note. Prospects were indeed black.

Joe Bigelow got little sleep that night. His bed seemed a large flaming note, while the covers appeared as an ever-growing pile of bills that threatened to smother him whenever he closed his heavy lids.

* * * *

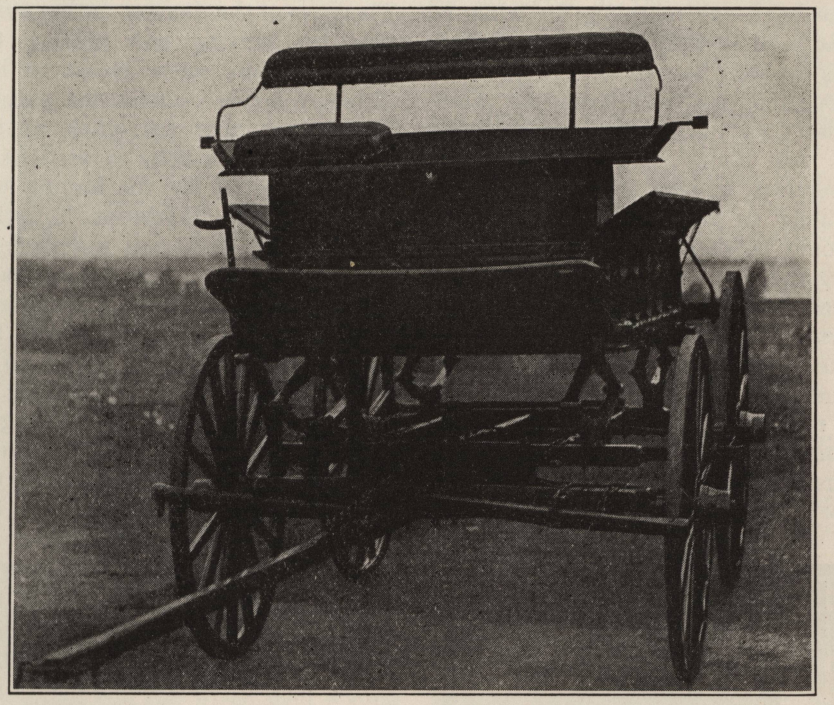
After he had opened his shop the next morning he sat down to read the paper, as usual, but could not seem to get interested in it. His eyes roamed from page to page when at last his glance fell upon a little sentence set inside a square of fanciful characters.

"Live for your business, and make your business live," read Bigelow.

The sentence seemed to hold some magic. He read and re-read it—then he cut out the little fanciful border with its message and pinned it up over his desk.

"I wonder if that's true?" asked Bigelow. "If it is, I haven't been working right–I haven't even scratched the outer shell of that truth, if it is truth. And to find out if that is true I'm going to live for my business and push it so hard toward success that there'll be no coming back."

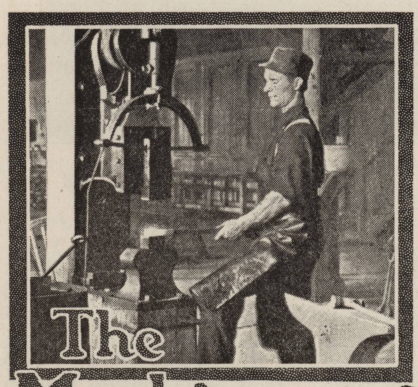
And suiting his words to actions he started right in. First he collected all the money he could possibly scrape together. Then he called on all good credit customers, and not only secured business that was going elsewhere but riveted attention to his shop in such a way as to keep business coming his way. When the newly secured work was going through the shop he gave it his personal attention, hustled it out and then hustled out, himself, after the money. By these aggressive methods he soon added a goodly sum to his bank account; and as a consequence he promptly took advantage of several liberal discounts on some of his



AN AUSTRALIAN WAGON. NOTE THE GENERAL CONSTRUCTION, THE UNDER GEAR AND THE HEAVY BUILD

recent bills. This had the effect of restoring the confidence of these jobbers and manufacturers, and also in again establishing his good relations at the bank.

It was with a trembling hand that Joe Bigelow opened a letter from the bank one morning, for while he had been working hard to re-establish his business he had no reason to believe that the bank would do otherwise than insist upon the payment of his note. He was surprised, therefore, to read that the bank was willing to renew the note if that would be of help to him in the reorganization of his business and credit. And in thanking the president of the bank a few days later the banker said, tersely: "It's simply business, Mr. Bigelow. We find that a man who pushes his business seldom has to be pushed for money. Just as long as you keep pushing we'll not push you."



Machine and Tool Smith

Making a Long Lead Screw for a Lathe

JAMES CRAN

There is nothing out of the ordinary in the making of a forging for a lead screw unless the lathe into which the screw is to fit happens to be out of the ordinary. Recently, the company by which the writer is employed had to build a 60-inch lathe that would measure at least 70 feet between centers. This meant that the bed of the machine had to be 80 feet, 6 inches long to accommodate the head and the tail stock and still leave the specified 70 feet between centers. As the lead screw of a machine of this kind projects beyond both ends of the bed, the forging for the screw had to finish 82 feet, 6 inches over all. To add to the difficulty of making a forging of this length the forge shop measured only 50 feet inside the walls. There were no lifting or handling facilities other than the men employed in the forge shop and a gang of laborers. Then, too, the longest lathe available for turning and cutting the thread on the screw measured but 35 feet, 6 inches between the centers. This meant that the whole of the work had to be done in sections.

The material for the forging was machine steel, .35 carbon, 3 inches in diameter, and was supplied to the forge shop in lengths of about 15 feet, making five welds necessary. The first section, upon which the collar was welded, was made up of two lengths of stock; making it approximately 30 feet in length. This was turned and had the thread cut to within about 3 feet of the end. It was then returned to the forge shop and another section of two more lengths of stock was welded on. To do this, one end of the screw had to be run outside through a hole in the end of the forge shop where it was lifted and handled by a gang of laborers while the forge-shop force took care of the lifting and handling, as well as the welding, inside. When it was returned to the machine shop the tail stock was removed from the lathe used to machine it, and the rough end of the forging was clamped firmly to the center in the head by means of a yoke and two bolts through the face plate. The finished end which overhung the end of the lathe bed was supported and kept in alignment by adjustable horses having wooden V-blocks for it to turn in. The third section was welded on and machined in exactly the same manner, the only difference being that

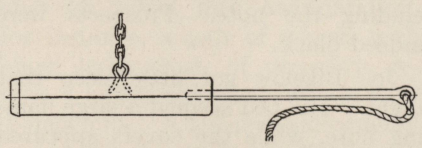


FIG. 1—THE RAM IS SUSPENDED FROM THE CEILING

more men were required to handle it.

In making lead screws and similar forgings without special facilities for the work a forge is placed in as close proximity to the steam hammer as possible. This is done to save handling and carrying. The first operation in forging a lead screw is to weld on the collar which on the larger screws is usually from 3 to 4 inches from the end. Welding on a collar is too ordinary an operation

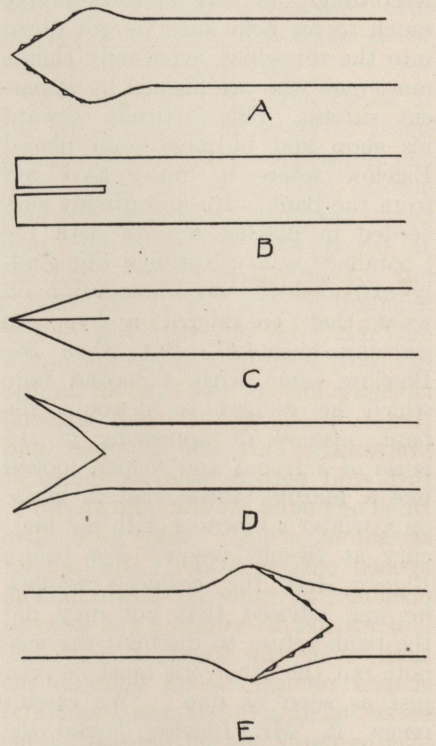


FIG. 2—BOTH ENDS ARE UPSET AND PREPARED FOR WELDING

to need any explanation and is in a great many cases all the forging that is necessary when the length of the machine it is intended for does not exceed 18 feet. When they are longer than that and have to be made up of two or more lengths of stock they are generally put together by what is known as the V or split weld. About 6 or 8 inches of the end of the bar, according to its diameter, is heated and upset by means of a ram of the type shown in Fig. 1. This is suspended from the roof timbers by a chain and swung horizontally by means of the rope. The bar while being upset rests on and projects over the lower die of the steam hammer, the other end being supported in a hook. Ramming or upsetting is continued until the diameter of the heated portion of the bar has been increased by about one quarter of its original size. The number of men required to do the upsetting varies according to the size of the work. Bars from 2¼ to 2¾ inches in diameter can be upset by seven men; four to swing the ram and three to hold the bar up against the blows. When the diameter exceeds that, a heavier

ram and more men are required.

In V or split welding the male scarf is made first and has a few sharp burs raised on the sides with a chisel, as shown at A, Fig. 2. It is then allowed to cool while the bar that is to be welded to it is being prepared. This bar is upset and then split with a hack, as shown at B. The points are then drawn down, as shown at C. They are then opened out, as at D. The tool for opening the split is shown in Fig. 3 of which the following is a description; A is the frame, B a wedge-shaped plunger which slides in the socket at the end of the frame and opens out the ends of the scarf. This plunger is struck on the end with the ram. A thumbscrew at C allows for adjustment to suit different diameters of stock. The handle at D enables one to hold the tool in position while it is being used. Bars from 2¼ to 2¾ inches in diameter are usually upset, split, scarfed, opened and closed in on the male scarf at one heat. It is important in split welding that the male scarf be cold or practically cold before the female scarf is closed in on it, so that the sharp burs on the sides of the male scarf will imbed themselves in the hot metal of the female scarf and hold them firmly together, as shown at E, Fig. 2. The heating and welding is done in a fire with two firmly packed sides rising at least 6 inches above the level of the top of the forge. The pieces to be welded are placed between the sides, and the top is covered with a large firebrick (which is banded to keep it from breaking and is also provided with chains by which it can be lifted off). The ends of the fire are banked up with green coal to within about 1½ inch of the brick, and the fire is fed with well charred coke, left over from previous fires. When the work is ready to be taken from the fire it is lifted and carried to the steam hammer with bars shaped as shown in Fig. 4. Usually on work of this kind each man is expected to handle about 100 lbs., so it will be seen that 20 men were required to lift the long lead screw here described, as its weight was approximately 2,000 lbs.

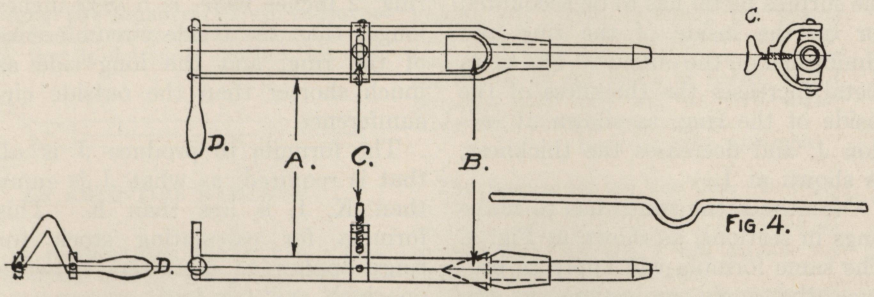


FIG. 4.

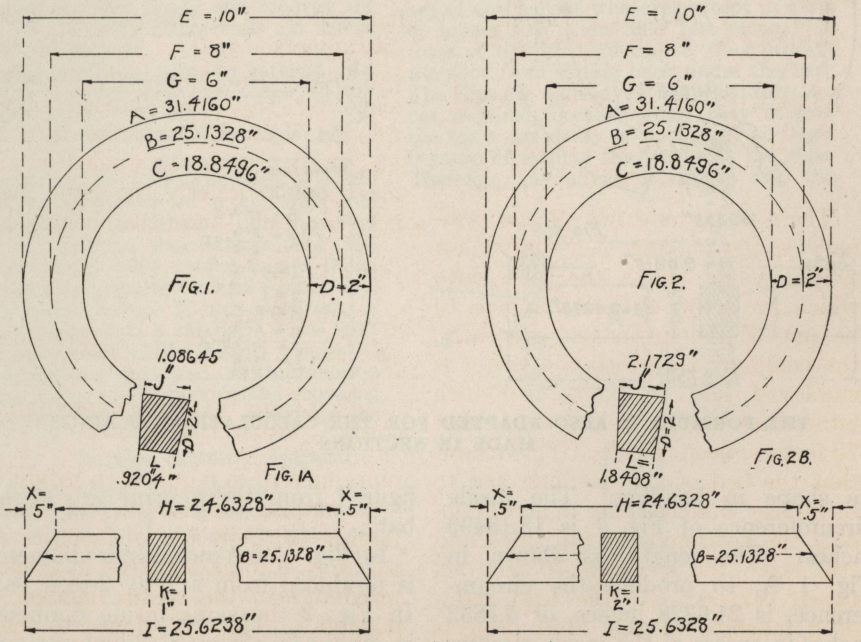
FIGS. 3 AND 4—SHOWING SPLITTING DEVICE AND A CARRYING HANDLE

A Formula for Accurately Calculating Stock for Rings and Bands*

S. UREN

Many different methods are produced by practical smiths to determine the proper length to cut the straight bar. The carriage smith will either roll the wheel over a long bar of iron or will use a tire wheel and roll the outside of the wheel and the inside of the tire, making the allowance for the openings between the felloes, which method is absolutely correct. In a locomotive or manufacturing shop conditions are different, as the smith works from drawings and in many cases has no means of measuring the circumference the ring is to fit over. Oftentimes the ring has to be finished on all sides in the machine shop, and the proper allowance has to be made for finishing. Many smiths have different methods of calculating the straight length of the bar. Many use the old rule, as 7 is to 22 so is the diameter to the circumference. Others take simply 3 times the diameter plus one-seventh of the diameter. Then again, others use the simple method of 3 times the inside diameter plus 3 widths of the iron. The writer's method is to use the formula, 3.1416, multiplied by the diameter of the ring at the neutral axis of the bar. The above methods are practically correct, measuring from the center of the metal, but do not give the short and long side of the straight bar, as shown at Fig. 1 A, 2 B, and 3 C. I, as well as others, have searched mathematical and mechanical books for formulas that would give the different functions of a ring that has been bent from a heated bar of iron of given dimensions. I could not find anything bearing on the subject; consequently, Mr. Harkins, my assistant foreman, (who is an expert mathematician) and the writer undertook to solve the problems, and have fully demonstrated and proved by experiments in

*This formula was produced by Mr. Uren several years ago and published in these columns at the time. Its republication now is in response to a number of recent requests for information on stock calculations for rings.



HOW THE FORMULA WORKS ON RECTANGULAR AND ON SQUARE STOCK

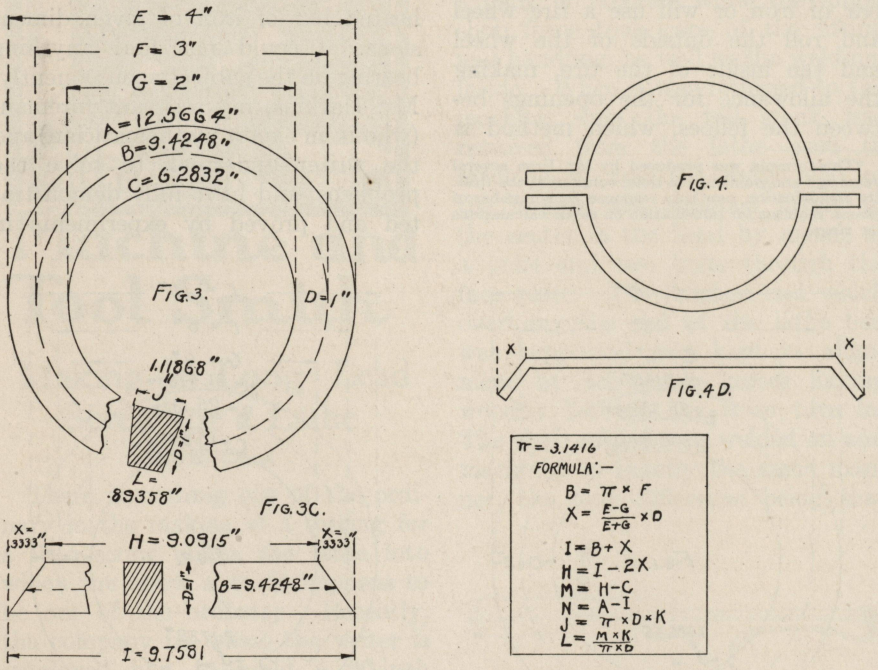
actual practice of the formula. Fig. 1 represents a ring bent from a bar of iron 2 inches wide by 1 inch thick. The usual custom of the practical blacksmith is to cut the bar to the length produced by the formula 3.1416 multiplied by the diameter of the ring and guessing at the angle to cut the end of the bar. Oftentimes, after the ring is bent, the inside would meet, leaving an opening on the outside, and if cut in excess, similar conditions on the inside. In nearly all cases the smith will cut his iron long, and trim to the proper shape after being bent. The formula of Fig. 1 A is simple and will give the angle. The end of the bar should be cut before bending. The difference of the long and short diameter divided by the sum of the long and short diameter, multiplied by the width of the iron, will give the required angle. The result in all cases should be added to the length produced by the above formula and the angle cut as shown at Fig. 1 A. If the ring is not to be welded, the ends will come together, forming a perfect joint.

It will be observed from Fig. 1 and Fig. 1 A, that the metal changes its shape in bending. The inside circumference of Fig. 1 is 18.18496 inches. The length as shown in Fig. 1 A, to produce the circumference, is 24.6328 inches, or 5.7832 inches in excess of the inside circumference of the finished ring. The reverse conditions exist in the outside of the ring. The actual length of the straight bar is 5.7832 inches shorter than the actual outside circumference of the ring; consequently, the surplus metal has to be accounted for on the inside of the ring and diminished on the outside. The extra metal increases the thickness of the inside of the ring, as shown at section J, and decreases the thickness, as shown at L.

Oftentimes the smith has to make rings in sections, as shown at Fig. 4. The same formula will apply to produce the angle projections in the straight bar. The usual custom of the smith is to guess at the angle when forging the projections in the straight bar and set the ends properly after the section of ring is bent. The formulae are correct, if the rings are bent at an even temperature and the metal has the same tensile and compression strength. Practically, the metal has about equal tensile and compression strength at a bright red heat. When making rings from uneven shaped iron, such as T shapes or channels, the formula 3.1416 multiplied by the diameter must be figured from the neutral axis of the bar.

In Fig. 1, a 6-inch inside diameter is produced from a 1 by 2-inch bar. In Fig. 2 the same inside diameter is produced from a 2-inch square bar. The figure produced by the formula corresponds to the dimensions of similar rings produced in actual practice. Very few smiths realize that the length of the short side of the straight bar in a 6-inch ring, 2 inches wide, is 5.7832 inches longer than the inside circumference of the ring, and the long side as much shorter than the outside circumference.

The formula to produce J is all that is required, as what J is more than K, L is less than K. This formula for calculating stock for rings applies to diameters between one inch and ten feet.



THE FORMULA IS ALSO ADAPTED FOR THE CALCULATION OF RINGS MADE IN SECTIONS

Queries—Answers—Notes

Welding and Tempering Auto Springs.—I would like to hear from some brother who is familiar with welding automobile springs, especially the tempering after welding. I weld them, but do not understand tempering and would like to hear from someone who is doing this kind of work successfully. H. C. HEITHECKER, Indiana.

In Reply.—The March issue, page 136, contains information on this subject.

Calculating Stock for Rings.—Brother Browning asks in the November number how much stock will be required to make a 5½-inch circle, bent edgewise, out of ½ by 1¾-inch stock. A. L. M. replies "22⅞ inches," which is a mistake. It will require 24 inches, which includes 1 inch for welding lap. It should be remembered that a piece of iron bent edgewise stretches on the outer edge more than it takes up on the inner. So we have very little contraction to contend with.

W. H. GUNN, Virginia.

That Scientific Horseshoer.—In the November number, Brother John Denbo seems to think that it was I who claimed to be a "Scientific Horseshoer," and if he had that impression he is mistaken. I quite agree with him in his remarks regarding the "Scientific Horseshoer," but do not want him to imagine that I pretend to title myself as one, by any means.

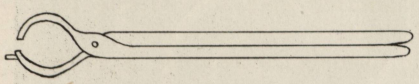
I turn out the best work that I know how and let my customers do the talking if it deserves any praise; therefore, I believe I have my colors down with the rest of the brothers.

The person to whom I had reference is a new man here and seems to think he "knows it all." He has cut prices so low that we cannot begin to compete with him

in this line. Of course, his work is just as low as his prices; nevertheless, it hurts the other smiths here. There are only four shops here, and there is more or less price-cutting carried on right along.

A GEORGIA SMITH.

An Auto Tire Remover.—I will endeavor to explain how to make an auto tire remover, that is if it is a clincher tire and



AN AUTO TIRE REMOVER

hard to remove from the groove. This tool is made of 1½ by ½ inch iron or steel, and requires two pieces 12½ inches in length. Punch holes about 6 inches from the end in each piece, place in vise and twist half around. Then make the jaws, and rivet the tip on ½ inch from the point of the jaws and 1 inch long. Place over tire, press on handles and your tire can be easily removed. Make handles 2½ feet from rivet hole. See engraving.

J. DENBO, Maryland.

Axle Setting.—In the November issue W. E. Riffe asks advice about setting axles and their length. When wheels are nearly the same height (as buggy wheels are) make front axle $\frac{3}{16}$ inch longer than the rear. If there is a difference of 6 or 8 inches in the height of wheels, make front axle ¼ inch longer; this will square the difference in height.

Second:—Set axles so that wheels will bear evenly on the bottom, which means a plumb spoke. The engraving represents buggy wheels with ¼ inch dish and tires 1 inch wide. Distance between tires is 2½ inches wider at top. Therefore, the rule is: All wheels should set at right angles at the bottom, which will bring face of tire to a square, plumb bearing.

W. H. GUNN, Virginia.

How to Melt Brass.—I would like to know how to melt brass or copper in a small crucible? I would also like to know how I could run new boxing in small machinery such as binders, etc., out of brass. I would like to use brass instead of babbitt sometimes.

FRED H. PETTIT, Oklahoma.

In Reply.—Brass melted in an open crucible oxidizes rapidly on the surface and must be carefully skimmed with a small rod or stick before pouring. Finely powdered charcoal sprinkled on the surface alleviates this oxidation. The fire used in melting should be deep and the blast moderate, and at no time should the crucible be subjected to a sudden fierce blast of heat or air. If the crucible is of good size it is well to build up around it with fire brick banked with coal and cinders to confine the heat. The temperature should be between 400° and 500°. The method in using brass for boxing is practically the same as in using babbitt.

E. V. S., New York.

A Connecting Rod for Mowing Machines.—Although I have never been called upon to repair mowers I have frequently made barrel eyes for various jobs, and perhaps my way of doing the work may be of help to Brother Gretton who asked how to forge a connecting rod for a mowing machine.

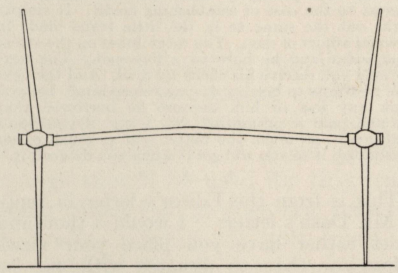
Take a piece of 3 by ⅜-inch (soft steel is preferable) and cut out as shown at A, then split and feather the ends slightly as at B, B. Now heat and turn around and shape up eye roughly with the aid of a ⅝ drift, and see that the scarfs which the splits form are in good shape for welding as shown at C. Now place in the fire and raise a good heat, insert the drift again and weld up with short swedges and quick blows. I make barrel eyes of various sizes in this way, and very little practice gives a good looking job. After punching the barrel, weld shank to length required; the only fault with this plan is a slight hollow in the center of the inside of barrel, but if properly done this will be very slight. Keep drift straight and smooth.

NEW READER, Australia.

The Reason for the Toe Clip.—In reply to Mr. Ernest Finley, regarding a toe clip on shoes and why it is used and the benefit derived from its use, I will explain my understanding of the matter.

Horses traveling on country roads and those working on plowed land or soft roads generally have sound and healthy feet, and for such feet clips are not necessary, because the foot is strong enough to hold the shoe on for the required length of time, which is about four or five weeks.

In hard, hilly sections and paved streets where there is no moisture in the ground the feet become very dry and the more or less contracted wall becomes brittle and broken. In cases of this kind clips are very necessary, and should be carefully and properly fitted so as to prevent cutting through the wall of the toe. The clip should fit against the laminae and be pushed up so



MR. GUNN TELLS ABOUT AXLE SETTING

that it will fit over outside of wall in the case of either a side clip or toe clip. The clip holds the shoe firmly and relieves the strain on the walls where nails are driven to hold the shoe on.

I am pleased to note the interest Mr. Dunston of Michigan has taken in my previous article.

ALBERT MEIER, Pennsylvania.

Tempering Cold Chisels and Bits.—Would like information in regard to tempering cold chisels and bits for drilling. I am repairing these in a railroad shop and should like to know exactly what temper to give them, as the men are expected to drill ⅞-inch and 1-inch holes through ¾-inch steel rail in three minutes with a ratchet. I use soft water but do not get the desired results. I will appreciate any and all information you can give me on tempering and repairing the tools I have described, especially the bits.

THOMAS BONNETT, England.

In Reply.—Heat the chisel to an even dark red, back as far as it has been drawn. Plunge it in the bath (water) straight down as far as you have it hot enough to harden; move it up and down a little, but not sideways. As soon as the chisel is cooled through take it out and rub one side bright (of course there is only enough heat left in this chisel to start the temper a little; that is all that is necessary); now hold it over the fire and draw it evenly all over alike to a regular cold-chisel blue.

A bit is hardened the full length of the twist, polished bright and the temper drawn to a purple by moving back and forth over the fire.

E. V. S., New York.

On Tempering Gun Springs.—Springs are generally made of a steel lower in carbon than ordinary tool steel, and as low carbon steel requires a higher heat to harden it is necessary to experiment in order to ascertain the proper temperature to produce the best results. The amount of heat given should be gauged by a thermometer. It ranges from 560° to 630°.

The following method is a very reliable way of tempering all kinds of gun springs: The spring is placed in a perforated pail which in turn is set into a kettle of oil or tallow. The cover should be high enough to take in the thermometer and should be provided with a long handle to facilitate putting it on in case the oil "flashes." Keep the thermometer away from air currents—in fact, the whole thing should not have any irregular air currents playing on it.

If the spring does not harden in sperm oil or tallow, use the following:

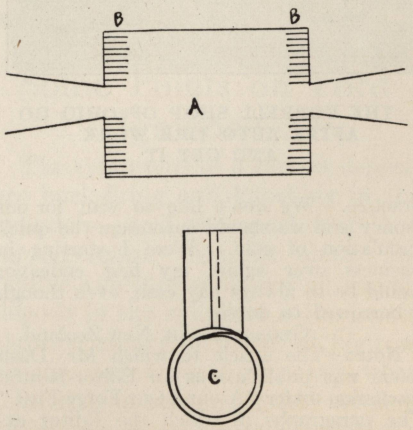
Spermaceti oil	48 parts
Neatsfoot oil	46 "
Rendered beef suet	5 "
Resin	1 part

Resin in the hardening bath has a tendency to crystallize the steel. Dipping the steel before heating into a dish of soft soap or some potash dissolved in water has the effect of preventing oxidation and helps to strike the scale.

E. V. S., New York.

Vicious Horses—Toe Clips.—I would like some information on how to manage wild, disobedient horses while shoeing them. Would it be dangerous to put them under the influence of chloroform? If so, what can be done to conquer them. It seems to incense them to be severe with them, so I would like a safe plan to follow, and any advice on the matter will be greatly appreciated.

One of the brothers wanted to know what benefit was derived from the toe clips on the shoes. I do not consider that they are of any benefit whatever except in cases of horses that slide their feet along. In cases of this kind, of course, they prevent the shoe from sliding back under the foot. The clips are a disadvantage when they are not required, because where they fit into the toe a dry decay is very likely to occur because of rasping the toe to fit the clips. Therefore, my advice is not to rasp the



A CONNECTING ROD JOB BY AN AUSTRALIAN

foot more than is necessary. Shoeing with wide calks is a good plan to follow.

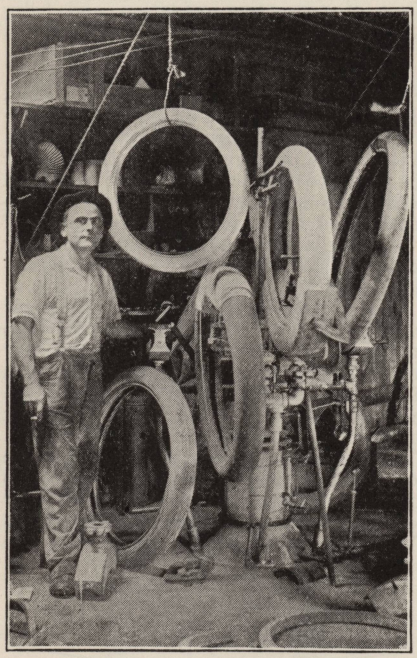
JAMES BOND, Kentucky.

In Reply.—A vicious horse can usually be subdued by the use of special ties. This issue contains an article on special ties and rope holds for animals, and will no doubt be found of practical value to many horseshoers. We have heard of some smiths who used chloroform, but we do not recommend this practice. J. F. M., New York.

Credit and How to Establish It.—In your July issue you published an article on "Establishing Credit When You Least Need It," and therein give circulation to what strikes me as a mistaken view on good business.

Countries may differ, and as I have not yet been in yours I will content myself by saying that in this country that article is wrong. It is the man who asks for no accommodation who makes the best buying and secures the best treatment from the merchant. It was recorded at the recent National Convention of Carriage Builders of New Zealand that to go to your merchant with ready money with which to buy was more profitable even than to indent from abroad. That it should prejudice a man when he asks for credit, to know that he has for years paid cash, is not sound reasoning, and here it is contradicted in experience. Quality, of course, will tell in buying, but that apart, cash will buy more than credit and will establish a better repute.

Let me say, too, that to hold up cash when you have it and can pay is very bad



THE CORRELL SHOP OF OHIO GO AFTER AUTO TIRE WORK—AND GET IT

practice. We don't like to wait for our money and we should encourage the quick circulation of coin. Were I starting in business over again, my first endeavor would be to always pay cash, even though I borrowed to do so.

GEORGE DASH, New Zealand.

Note:—The article to which Mr. Dash refers was published as an Editor-Benton discussion under "Around Our Forge Fire." The paragraphs in which the Editor expressed the views with which Mr. Dash disagrees so radically are reprinted together with the Editor's reply to Mr. Dash's letter. It is the desire of both Mr. Dash and the Editor that this subject be discussed thoroughly by other readers. Express your own views on this matter, for as Mr. Dash says, "Unless one states one's views there will never be any progress toward the light we all seek."

These are paragraphs from the article:

* * * *

"Suppose you are in business, you buy your goods from manufacturers and jobbers; and doing a good business you make a point of discounting your bills regularly and promptly and are considered an ideal customer by all from whom you buy. Now, let us suppose some big deal comes along for which you need ready money and in which deal your money will be worth more than in discounting your bills. Just so sure as night follows day will your manufacturers and jobbers start a-gossiping and remarking about your strange, unexplainable failure to discount your bills; and the very fact that you were so ideal in this respect will be the means of destroying your credit. While you, on the other hand, were beginning to think that because you were paying promptly each and every month you could get just about anything and everything you wanted from any house. Again I say, the time to establish credit is when you do not want it—then you'll have it when you need it."

* * * *

"In the first place," began the Editor, "credit is worth something; so if it is going to cost anything to establish credit we shouldn't hesitate about paying a reasonable cost. Now, let us suppose we are in business. We are able regularly to pay and to discount our bills, but we don't. Every once in a while we take full time and sometimes a little over. Of course we pay in the end and we lose the discount, but we are establishing credit. Then one day we both hustle over to our bank to have a note discounted—we don't need the money, but we do need the credit, so we can afford to become offended if the bank refuses and we can afford to take our account down the street to the other bank. Of course the interest on the note is something, but so is the credit that we are trying to establish. And anything that is worth anything is worth paying for. So we pay our note promptly when due and charge the interest to the cost of establishing credit. It simply works out the same as in the little loans made in personal affairs of men. You meet Jones on the street or at lodge and he borrows a five-spot. The next morning you receive his check by mail. And the next time he wants to borrow do you refuse him? Do you think any less of him because he borrowed that five and paid it promptly? So, I say, if you don't need credit, so much the better and so much easier to establish it so you will get it when you do need it."

* * * *

This is from the Editor's letter in reply to Mr. Dash's letter: "I would a thousand times rather have you place your views before me than to disagree with me so radically and say nothing whatever.

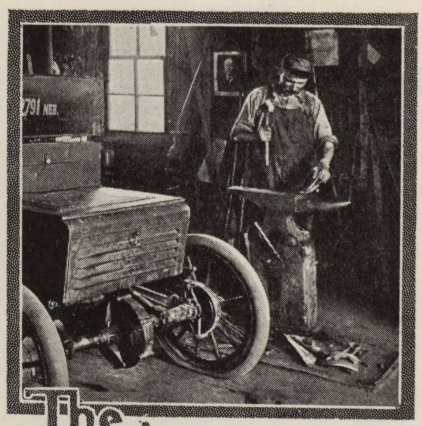
"With reference to criticism. If you will re-read paragraph three in my discussion you will find that the case cited is an absolute fact. And I do not believe that changing the scene from the United States to New Zealand soil will alter the facts much.

"That discussion on credit was not written on the spur of the moment nor without considerable thought being devoted to the subject."

* * *

I think perhaps in considering this matter that if we will regard it as bearing right upon our own business, if we will put ourselves in the place of the man who extends the credit, we will see the matter correctly. Suppose, for example, that we have a customer who has always paid promptly immediately upon receiving our bill; but one month comes when we do not hear from him immediately. We send our bill as usual, but no check materializes. We are suddenly brought to realize on the 10th, when going over our accounts, that "So-and-so" has not yet paid. "He always pays on the 2nd or 3rd at the latest," we tell our wife, "cannot understand." Still we wait and still no check on the 14th. Finally, we see the grocer and ask him confidentially about "So-and-so." He reports that he also is puzzled, and the butcher and the drygoods man tell the same story. "He always paid promptly. I wonder what's the matter." And so, finally, the thing may work out so as to destroy the man's credit instead of strengthening it.

THE EDITOR.



The Automobile Repairman

When water is left in the engine in an unwarmed place, trouble, of course, is expected, and if the frost be at all severe, trouble there will undoubtedly be; but it is rather galling after the water has been drained out of the radiator and engine to find that when the thaw comes the cylinder jacket is cracked after all. Mud and sediment are apt to collect around the bottom of the water jackets, and as the water drains out of the jackets this sediment is very apt to stop the cock before all the water has been run off. The only safe way is to watch the water running out of the jackets, and directly it stops flowing the tap should be probed with a piece of wire. Nearly always more water will begin to flow, and directly it stops the tap should be probed again and again till no more water issues from it.

If gasoline drips from the carburetor when the car is standing with the engine stopped, the needle valve connected with the float should be investigated. If pressing down stops the dripping, the float is too high. If the dripping persists, the valve leaks and should be ground to a fit, preferably using pumice stone.

In draining a radiator in a car in which the radiator drain cock is so placed that the water from it strikes the axle and spatters over things generally, it is a good plan to place the edge of a funnel against the valve and thus direct the flow of water away from the parts of the car into a pail.

Care of oil lamps. While it is common knowledge that acetylene lamps must be kept clean, it is often imagined that an oil lamp ought to go indefinitely without an internal clearing. One of the commonest reasons for oil lamps going out is the choking of the draught holes in the cap of the lamp by deposits of carbon. These should be looked for and removed before any lengthy drive at night. The other essentials are a good lamp, good oil and a clean, dry wick.

The introduction of a little flake graphite into the lubricating oil, in the proportion of about a teaspoonful to a pint of oil, builds up even the most microscopic irregularities on bearing and wearing surfaces of pistons and cylinders; resulting in better lubrication of the cylinders, better compression and great economy in oil.

To repair punctures in tubes, first see if the puncture is in one wall of tube, only, or if both walls are perforated. Be sure that the article causing the puncture has not lodged inside the tube. Lay the tube on a convenient flat surface and then with emery paper clean around the puncture a space slightly larger than the patch to be used. Select a patch about an inch and a

half larger than the injury in tube and clean it carefully on flat or unbeveled side with emery paper. Coat cleaned surfaces of both tube and patch with cement, letting same dry thoroughly. Then apply a second coat. After about ten minutes, when surfaces are dry but still "tacky," press patch firmly in place, excluding all air bubbles with the fingers, taking care that edges of patch do not curl. Now tap patch lightly all over its surface with some round, smooth object like the end of a tool handle. This, if done carefully, will exclude every particle of air and the cemented surfaces will adhere perfectly.

When a nut has been lost, and no duplicate is at hand, as good a plan as any is to wind the threads of the bolt tightly with soft iron wire, such as stovepipe wire, or with soft copper wire, a coil of which should be on hand in every repair shop, as it has many uses. The winding should start at the end of the bolt and follow the threads up to the part that it is desired to retain. The wire is then wound back in a second layer over the first and the ends twisted together. A metal washer nearly the size of the bolt if available will prove of value to place next to the part to be retained before starting to wind the wire. If there is a hole in the bolt for a cotter pin or split pin, one should be inserted and the ends of the wire twisted around it, so that the improvised nut cannot screw itself from the bolt. If the split pin hole is of large enough size the distance between it and the part to be retained may be filled up with washers of metal or wood and a large nail driven into the hole will act as an effective support for the parts. Then, again, when used for light work, a washer of wood or leather may be screwed on the bolt. If the nut is in an important part of the mechanism take one of suitable size from some other portion of the car which is not of real importance.

If a carburetor catches fire through a backfire, the fire may occasionally be extinguished by turning off the gasoline and racing the engine. The engine will soon suck it out, and there is very little danger.

Spare asbestos washers should always be treated before being placed among the spares on the car. A six hours' soaking in olive oil followed by a draining and brief drying and a final rubbing in of fine black lead will give a good tight washer that will come adrift cleanly at any time.

Too great care cannot be exercised in keeping the mudshield below the engine and gear-box clear and free from volatile oils. Despite supposedly adequate provision for drainage, the average undershield usually contains a small-sized pool of mingled grease, water and oil which is as tinder to a possible spoonful or two of gasoline, such as may trickle down from the carburetor at almost any time.

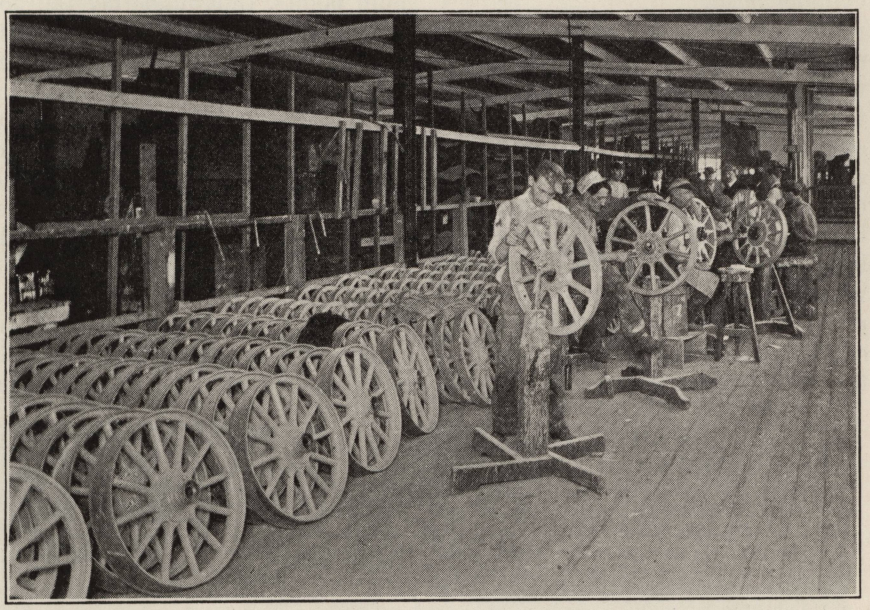
Where rubber hose is used to make connections in the water circulation pipes of a gasoline motor, and has bends in it, a good plan is to reinforce it by a brass coil spring which is a good fit inside. This prevents any flattening at the bend, and cracking, resulting eventually in a leak.

How to Wash the Automobile

It requires skill to wash an auto quickly and effectively. For a dry, mud-covered car, the body should first be soaked—do not squirt the water on, as the force of the liquid against the mud particles will scratch the varnish. The water should be flowed on, and if tepid—not hot—all the better. Forced water may be applied to the wheels, underneath the fenders and on the running gear. After having thoroughly soaked the machine—say about twice—it should then be sponged. A good quality sponge should be used for this, care being taken that it does not scratch. A warm solution of soft soap is advisable if the solution is not strong and the car immediately rinsed afterward. If using ordinary washing soap, a very weak solution should be made, as the lye contained in the soap reacts on the varnish. After sponging the body carefully, changing the dirty water several times, the running gear may be attacked with more vim. Scraping underneath the fenders is often necessary. It won't hurt the car there, but don't do it in any other place! Sponge carefully between the spokes and the spokes themselves. A different sponge—a coarser one—should be used for the lower part of the machine. The rear axle housing, the front axle and cross-rods—these must all be gone over with care. Having sponged the car it should then be rinsed, flowing the water, and then drying and polishing with a clean chamois; using a good grade chamois on the body, and roughly going over the lower part with a poorer one. The windshield should also be washed and chamoised. Some tops will admit being washed, others will not—don't try it on the latter.

If no running water is available, it should be soaked in by a sponge; that is, the sponge filled with water and then pressed against the mud, expelling the water and softening the mud. This method is somewhat slow, but it must be followed where there is no running water, and is far better than scratching the varnish and doing a poor job.

Don't forget to charge a proper price for your work. A dollar for a wash on an ordinary five-passenger car or smaller is about right, and a dollar and a half for washing and polishing. This includes dusting the interior, cleaning the top, cleaning and polishing the dashboard and its parts, speed levers, lights and all brass or nickeled work. For a smaller car less may be charged for polishing and more on a larger.



IN THE WHEEL-PAINTING SHOP OF A LARGE AUTOMOBILE FACTORY

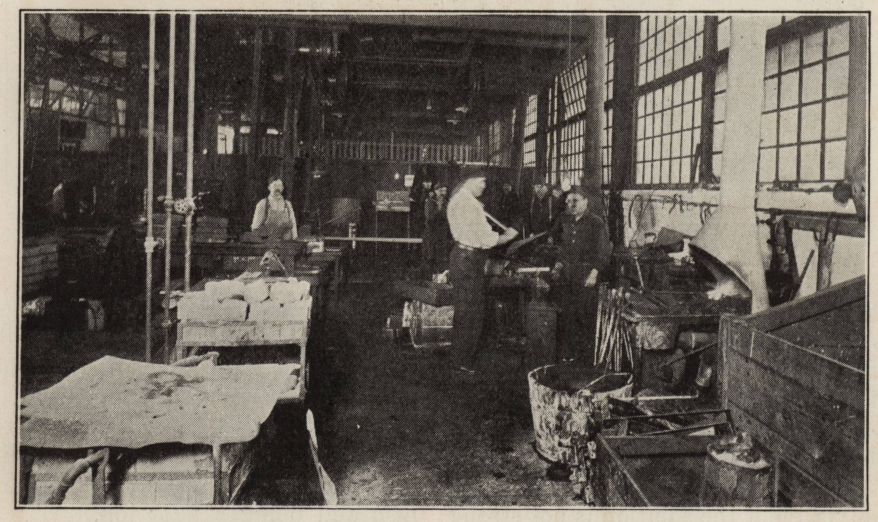
Some Points on Ford Ignition—2

The symptoms of a carbon deposit are back-firing and knocking in the cylinders—as if the spark were too far advanced. Another almost infallible evidence of excessive carbon deposit in the cylinders is the motor showing plenty of power at high car speeds, but a lack of power when hill-climbing on high gear. At slow engine speeds, the incandescent carbon projections serve to pre-ignite

the charge; thereby reducing the power of the motor. The cure is to take off the cylinder head and scrape off the carbon deposit from the top of piston and inside of cylinder head.

Carbon will also form on the porcelain portion of the spark plugs; thereby furnishing a circuit which the high tension current may travel over rather than jump between the sparking points of the plug. Usually, only a part of the current will pass by way of the carbon film, still leaving a weak spark at the points which, in open air, when testing plugs may seem strong enough. This causes intermittent firing. The symptoms are similar to a poor contact point is reached at which the motor develops the maximum speed. Too close contact between the adjusting screw and vibrator will cause the current to "arc" between the platinum points, thus hindering the flow of current, burning away the platinum and often putting the coil out of action. This may be remedied by cleaning the points with fine emery cloth. If the platinum points become pitted or worn so that imperfect contact is made they should be filed flat with a thin watchmaker's file, so that the surfaces meet each other squarely.

With the vibrators properly adjusted, if any particular unit fails, or seems to develop only a weak



THE BLACKSMITH SHOP IN AN AUTOMOBILE PLANT IS AN IMPORTANT DEPARTMENT

commutator. This condition is difficult to detect, for the reason that when the plug is subjected to the usual test of removing it from the cylinder and closing the electrical circuit the spark is seen to jump free and "fat" between the points. This, because the electrical energy which is sufficient to jump between two points one half inch apart in the open air will jump less than one sixteenth of an inch in the chamber under 60 pounds' compression. If there's any carbon on the spark plug porcelains, clean them.

Coil Adjustment

The usual method is to turn the adjusting screw down until the vibrator stops buzzing; then turn the screw back slowly until a good spark is obtained. It is important to have all the units adjusted alike, and with a little experience you will be able to "feel" by the explosions when the action, change the position of the unit to determine if the fault is actually in the unit. Remember that a loose wire connection, faulty spark plug or worn commutator may cause irregularity in the running of the motor; points that should be considered before laying the blame on the coil. The first symptoms of a defective coil is the buzzing of the vibrator with no spark at the plug. A leak in the condenser is often indicated by a "fat" bluish spark, but to make sure this is the cause of the trouble put a spark gap of about one thirty-second of an inch between the secondary wire and plug. If the condenser leaks, the spark will be irregular at the gap.

Commutator

The commutator should be examined when ignition trouble arises, to see that the roller makes proper contact with each point.

To remove commutator, unscrew the cap screw which goes through breather pipe on top of time gear cover. This will release the spring which holds the commutator case and fibre in place and these parts can readily be removed. Unscrew lock nut; withdraw steel brush cap and drive out the retaining pin. The brush can then be removed from the cam shaft.

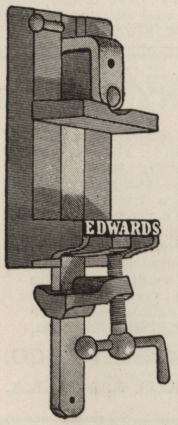
In case the fibre, contact points and roller are badly worn the most satisfactory remedy is to replace them with new parts. The spring should be strong enough to make a firm contact between the roller and the points.

In replacing the commutator, crank the engine over until No. 2 inlet valve opens wide; then turn the crank just enough to bring the valve two thirds of the way on the down stroke; set the commutator so that the lead rod connection is in a vertical position.

Leaky valves make themselves manifest by loss of compression, easily discoverable in cranking the engine.

For grinding purposes, either ground glass or fine emery is commonly used. A convenient way is to put a small amount of emery in a suitable dish, adding a spoonful or two of kerosene and a few drops of lubricating oil to make a thin paste. Place the mixture on the bevel face of the valve, put the valve in position and rotate it back and forth (about a quarter turn) a few times, then lift slightly from the seat to change the position of the valve and continue the operation until the bearing surface is smooth and bright. The valve should not be turned through a complete rotation, as it is apt to cause scratches running around the entire circumference. When completed, the valve should be removed from the cylinder, thoroughly washed with kerosene and the valve seat wiped out thoroughly clean. Extreme care should be taken that no abrasive substance gets into the cylinders. If the valve seat in the cylinder is ridged or in bad shape it is best to have the seat re-trimmed with a valve seating tool. This operation requires considerable skill, and care should be exercised against making too deep a cut, necessitating re-timing the valve.

Edwards Drilling Vise



Looks Good To You, Don't It?
Holds the work while you are drilling it. Swivel Jaw, 6-in. Wide, 3-in. High; Opens 9-in. Has a sliding self-grip Hand-Screw.

The adjustable Sliding-Bar serves as a Handle for the Vise. Weight, 36 lbs.

Edward's Shears

For twenty years the **Two Leading Low-Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4 x ½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4 x ¾ inch soft steel.

At their price you should have had one long ago. **Order** from the first supply man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. Edward

ALBERT LEA

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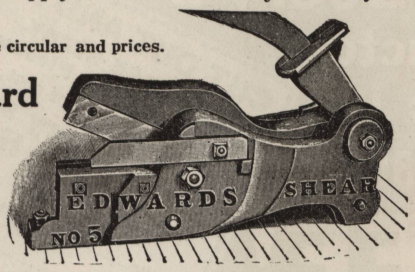
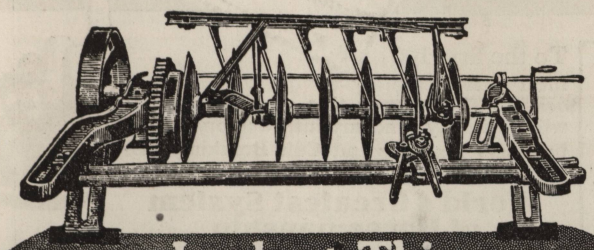




Look at This No. 5 Novelty Disc Sharpener

Just the sharpener that will MAKE MONEY IN YOUR SHOP.

Can be used to sharpen a single plow disc or rolling coulter, large or small. A whole set of discs, any size or number, can be quickly sharpened by the No. 5 Novelty Disc Sharpener without removing the discs from the frame.

No Parts Have to be Changed to Sharpen Different Sizes or Styles of Discs.

The most complete sharpener ever made for all kinds of disc work. Every shop should have one to take care of Spring sharpening work.

Your jobber will supply you with a NOVELTY DISC SHARPENER. If not, write us and we will ship direct.

CIRCULARS ON REQUEST

WALKER MFG. CO.

Council Bluffs, Iowa.

Firestone Hoof Pads

In seven styles, for every horse, at every work, in every weather.

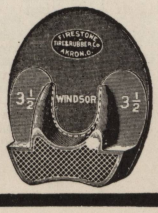
Firestones are the choice of careful owners the country over because they insure safe, quick and easy going, with complete hoof protection.

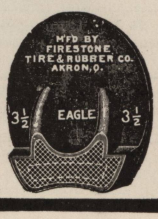
They insure, also, quick and easy work for the horseshoer, and continued sales-satisfaction.

The combined power in your reputation and the Firestone name will prove irresistible to draw trade and hold it.

Your Jobber Has Prices and Sample Sets of the Seven Firestone Styles

The Firestone Tire and Rubber Company
Akron, Ohio
All Large Cities





WANTED AND FOR SALE.

Want and For Sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents. The small cost of these advertisements prevents our investigating and guaranteeing them. We WILL NOT knowingly accept any but reliable ones.

FOR SALE—Blacksmith shop, 20x40; 2 story new building; wood shop, 16x20, 2 story. Tools and work for two men. 8-room house joining. Good reasons for selling to anyone interested.
STRICKFADEN & SON, Poseyville, Ind.

FOR SALE—A nice supply of good home, made and fire cured chewing and smoking tobaccos. Fresh and sweet from the barn. Special price on lots of 100 lbs. or over. For prices and further information, Address, **D. E. WALL, Cumberland Furnace, Tenn., R. No. 1.**

WANTED—Helper in a general shop—one who can drive shoes—steady work. **J. E. BEATTY, Kahoka, Mo.**

FOR SALE—30-inch planer. Hollow chisel mortiser. Screw-cutting lathe. **W. A. REINEKE, Perry, Ill.**

FOR SALE—Power blacksmith shop, tools and lot. Good location, good school. Reasons for selling, have other business. For particulars, address, **B. KLOEPPING, Greenville, Iowa.**

FOR SALE OR RENT—Horseshoeing and blacksmith business in live place of 1000 inhabitants. Power shop. Price right. **JUDD S. PARKER, Yorkville, Ill.**

FOR SALE—Blacksmith shop, two lots with dwelling. Address, **MRS. E. S. WALLER, Londonderry, Ohio.**

WANTED—A plow sharpening machine, circle saw, shafting and belting for small shop.
J. BRIGGER, Lamar, Mo.

AUTOMOBILE cylinders rebored, pistons and rings fitted, $8.00 to $12.00 per cylinder. Cranks, connecting rods, crank cases, cut gears, in chrome nickel steel, brass, fibre, etc., duplicated like new. Send old parts to go by. Also build power tapping and threading machines for horse shoes and bolts.
McCADDEN MACHINE WORKS, St. Cloud, Minn.

FOR SALE—Big, free bargain list of stationary-portable traction-marine automobile engines and supplies. **BADGER MOTOR CO., Milwaukee, Wis.**

FOR SALE—Blacksmith and Woodwork shops at Pierceton, Ind., on Pennsylvania R. R. Established trade for twenty years, in good farming country. Close to best fishing lakes in State. Address **BOX 88, Winona Lake, Ind.**

CASH FOR YOUR BUSINESS OR REAL ESTATE—I bring buyer and seller together. No matter where located, if you want to buy or sell, address, **FRANK P. CLEVELAND, 1219 Adams Exp. Bldg, Chicago, Ill.**

BROTHER—Accidentally have discovered root will cure both tobacco habit and indigestion. Gladly send particulars. **C. X. STOKES, Mohawk, Fla.**

HAVE YOU ANY FRIENDS

in the smithing craft whose good will you especially esteem? There is no better way of showing them your friendship than by a small gift; there is no gift which such a friend would appreciate more than a year's subscription to The American Blacksmith. It will remind him of you constantly for an entire year, and furnish him with interesting, valuable reading which he will greatly like. If you have any friends who are not subscribers, write us for terms of subscriptions for them.

AMERICAN BLACKSMITH CO.
P. O. Box 974, BUFFALO, N. Y., U.S.A.

TRADE LITERATURE & NOTES.

Many of the Largest Plants of the United States started in a blacksmith shop. There is one branch of manufacturing that could be followed profitably by almost any blacksmith, the making of a light-weight tractor to be sold at a reasonable price. The light tractor is in

the same stage of development now that the automobile was twelve years ago. It is safe to say that in the next ten years there will be more than a hundred thousand tractors sold to the American farmer.

A large number of farmers have built home-made outfits with an ordinary gasoline engine mounted on a wooden frame, with old binder wheels for drive wheels. The fact that many of these outfits are giving good service, indicates what could be done by an enterprising blacksmith who secures a suitable engine and uses good judgment in planning his outfit.

The illustration shows a home-built outfit suitable for pulling two or three plows, and for all-round farm work. The engine and radiator used on this outfit were supplied by the Ellis Engine Company, whose advertisement will be found on another page of this issue. The Ellis 12 H. P. Engine is admirably adapted for light tractor work, because it is light in weight in proportion to power developed; it runs successfully on common, cheap kerosene, it runs in either direction and can be reversed while running; it runs without vibration; and has an absolutely sure system of oiling. Ellis Engines in all sizes are sold to blacksmiths at special discount prices, for mounting on tractors or for shop work. Those interested should write the Ellis Engine Company, 97 Mullett St., Detroit, Mich.

An Advantage to carriage workers and blacksmiths in dealing with the carriage manufacturing firm of Buob & Scheu of Cincinnati is this firm's facilities for making every article needed for buggy, carriage and automobile tops or trimmings. To the smith who is specializing in automobile work and enlarging his business by building up such a department the Buob & Scheu line of automobile tops will be particularly interesting.

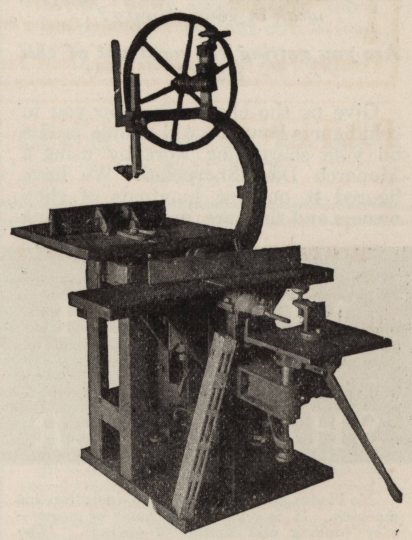
A catalog giving complete details will be sent to every smith or carriage man writing to Buob & Scheu, 498 Court Street, Cincinnati, Ohio.

In Calling Our Readers Attention to the advertisement of Gold Cross Varnishes, on another page of this issue, we do so feeling that for all kinds of carriage and auto work these varnishes will enable the smith to turn out the finest jobs. The Stewart-Mowry Co., Chicago, Ill., manufacturers of Gold Cross Varnishes, is a reliable firm specializing in the manufacture of a most complete line of carriage and auto varnishes. They make everything from Japan to Finishing Varnish.

Their interesting booklet and prices will be sent to any reader on request.

In Adding a hollow chisel mortising machine to the Tannewitz Woodworker this machine will be of even greater value to carriage men, according to a recent communication from the makers, The Tannewitz Works, in Grand Rapids, Michigan.

Two attachments—one a pole and fellow rounder and the other a spoke equalizer and tenoner—are features particularly useful for blacksmiths. Regular equipment includes a band saw, saw bench and jointer.



The machine, is fully guaranteed and will be shipped on a ten-day trial. Complete details will be furnished by the makers upon request.

Several Testimonials from reliable sources have come to us telling about the successful use of Absorbine for inflamed or swollen joints, sprains, bruises, soft bunches, boils, fistula and other sores or inflammations. It was used successfully in one case where a horse had paralysis in

(*Continued on page 39*)

CLASSIFIED BUYER'S GUIDE.

For Alphabetical Index to Advertisers, see page 27.

When Writing to Advertisers Please Mention The American Blacksmith.

Current Heavy Hardware Prices.

The following quotations are the lowest prices generally prevailing, December 22, 1913. They are subject to change without notice, and higher prices are charged according to quality specifications and other conditions.

With the exception of a reduction in iron and steel quotations there are no changes Current Heavy Hardware Prices

Changes in the prices of wood stock items are expected but will probably not materalize before the first of the year.

The unseasonable weather has tended to retard trade considerably in some sections. Cold weather must, however set in soon when much better trade conditions may be expected. There has also been a general depression in all lines that is hoped will turn for the better after the first of the year.

Collections are generally considered not as good as might be, though a general improvement in road conditions will better conditions.

Horse Shoes—

All Iron Shoes	$4.30
Steel Shoes	4.10
No. 0 and No. 1, 25c. extra. 15c. per keg additional charged for packing more than one size in a keg.	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Anvils .11

Merchant Bar Iron—
$1.80 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$1.80 rates, full extras.

Toe Calks—

	Per Box
Blunt	$1.25
Sharp	1.50

Screw Calks—

	5/16	3/8	7/16	1/2	5/8
Blizzard M	$18.00	$18.00	$20.00	$20.00	$22.00
Sure Grip M	18.00	18.00	20.00	20.00	22.00
Bl. D'md M	18.00	18.00	20.00	20.00	22.00
Red Tip M	20.00	20.00	22.00	22.00	24.00
Rowe,Jr. M	18.00	18.00	20.00	20.00	22.00
R. Rg. Pt	100 2.00	2.20	2.40	2.60	3.20

Plow Lays—

Solid Cast	$ .08¼
Crucible	.09¼
Soft Center	.12¼

Fitted Plow Lays—

Crucible, 12″	$1.50
Crucible, 18″	1.90
Soft Center, 12″	1.90
Soft Center, 18″	2.45

Quick Repair Lays—

Crucible, 12″	$1.40
Crucible, 18″	1.70
Soft Center, 12″	1.80
Soft Center, 18″	2.25

Hickory Lumber—Per Foot—

1 to 2½	$ .10
2½ to 4¼	.12

Ash and Oak Lumber—Per Foot—

1—1¼	$ .08	2½—3	$ .09
1½—2	.08½	3½—4	.10

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
⅜″		$75.00	$ 85.00
½″	$75.00	78.00	90.00
⅝″	78.00	85.00	95.00
¾″ and ⅞″	85.00	90.00	114.00

Rough Hickory Axles—

	Each
3 x 4 x 6 ft.	$ .75
3½ x 4½ x 6 ft.	1.00
4 x 5 x 6 ft.	1.30
5 x 6 x 6 ft.	2.40
4 x 5 x 6½ ft.	1.75
4½ x 5½ x 7 ft.	2.30
5 x 6 x 7 ft.	2.80
5 x 7 x 7 ft.	3.40

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—

	x 4	x 4½	x 12	x 14	x 16
3 x 4	$ .36	$ .40	$1.30	$1.35	$1.75
4 x 5	.60	.70	2.20	2.55	3.00
5 x 6	1.00	1.20			

Finished Oak Bolsters—

2¾ x 3¾ and under	$ .60
3 x 4	.65
3¾ x 4¾	.80

Rough Oak Wagon Tongues—

4 x 4 x 2 x 4 x 12 and smaller	$1.15

Finished Oak Wagon Tongues—

3½ and smaller	$1.35
3¾	1.45
4	1.55

Two-Inch Sawed Hounds

	Per Pair
Tongues	$ .35
Front	.40
Hind	.50

Wheels—

Sarven Patent—white—not tired	50%
Tiring—No. 13 and less	45%
Tiring—No. 17 and larger	30%
Screws 1¼″ Thread and less	50%
Rivets 1¼″ Thread and less	40%
Screws or Rivets 1½″ and heavier	40%
Boring or Boxing less than 10 set lots	40%
Boring or Boxing 10 sets or more of one size	60%
Priming wheels, net	25c
Oiling not tired, set	20c
Allowance of 25c per set on all special tired wheels with three or four piece rims	
Oiling, not tired, No. 17 to No. 39	25c
Oiling No. 45 and larger	40c

Special Wheels Tired—

No.	Tire	Per Set	No.	Tire	Per Set
0	¾ x ¼″	$6.80	9	1⅛ x ¼″	$8.95
1	⅞ x ¼″	7.05	9	1⅛ x 5/16″	9.40
3	1 x ¼″	7.40	13	1¼ x 5/16″	11.60
3	1 x 5/16″	7.65	13	1¼ x ⅜″	12.00

Cupped Oak Hubs—Set

7 x 8 x 9	$1.30
7 x 9 x 10	1.50
8 x 9 x 10	1.55
8 x 10 x 11	1.80
9 x 10 x 11	1.95
9 x 11 x 12	2.00
10 x 12 x 13	3.00
11 x 13 x 14	4.20
12 x 14 x 15	5.10

Plain End Oak Hubs-Set

10 x 14	$3.30
11 x 14	4.20
11 x 15	4.50
11 x 16	5.10
12 x 16	5.75
12 x 17	6.30
13 x 18	7.00

Rough Sawed Felloes—

1½ x 2″	$1.70	2 x 2½″	$2.10
1¾ x 2¼″	1.90	2½ x 2″	4.60
1¼ x 2⅝″	2.00	3 x 3″	5.50
		3 x 3½″	$5.75

Ironed Poles, White, XXX—

1¾ x 2¼″ No. 2	$3.80
2 x 2½″ No. 3	3.80

Ironed Shafts, White, XXX—

1⅝ x 2″ and smaller	$1.95
1½ x 2″	2.20
1½ x 2¼″	2.70

Farm Wagon Bows—

Round Top, ½ x 2″	$ .60
Flat Top, ½ x 2″	.75
Round Top, 5/8 x 2½″	1.35

Standard Size Piano Bodies with Seats—

Each	$4.25

Plow Beams—

1 Horse	$ .60
2 Horse	.75
3 Horse	1.10

Spokes and Rims—
Oak and Hickory Spokes, Net on Weis & Lesh List No. 6.

Finished Rims–XX–⅞″	$1.50
Finished Rims–XX–1″	1.65
Oak Rims—Discount	40–10%
Hickory Rims	40%

Wagon Neckyoke Woods—
Keller & Tamm's List—Discount 25%

Wagon Whiffletree Woods—All Grades
Keller & Tamm's List—Discount 25%

Oval Plow Doubletrees—

2¾ x 36″	$1.60
3 x 40″	2.40

Flat Plow Doubletrees—
1¾ x 3½ x 42″. $2.75

Wagon Evener Woods—
2 x 4 and 2 x 4½—Keller & Tamm's List—Discount 30%
Larger 25%

Buggy Evener Woods—All Grades
Keller & Tamm's List—Discount 25%

Buggy Whiffletree Woods—
Mixed Second Growth and Second Growth—Keller & Tamm's List—Discount 20%

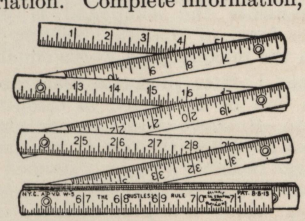
Buggy Neckyoke Woods—All Grades
Keller & Tamm's List—Discount 20%

(*Continued from page 35*)

the hind quarters. The manufacturer, W. F. Young, P. D. F., 230 Temple Street, Springfield, Mass., states that it will not blister or remove the hair under the bandage and that the horse usually can be worked while the medicine is being applied. Mr. Young will be glad to give details.

Blacksmiths Seeking efficiency in small matters as well as large we believe will be interested in the "Rustless" Rule. It is made of Luminoy—a special alloy of aluminum that keeps bright without polishing or rubbing—and moisture, snow or water will not rust this rule.

Accurate, distinct divisions to $\frac{1}{16}$ of an inch are stamped on both sides, and the makers claim these marks can not be rubbed out or worn off by abrasion. This rule is stated to be as strong as a steel rule, but costs less and weighs only about an ounce per lineal foot. Joints are always snug and the makers claim there can be no variation. Complete information, prices



and lengths can be obtained by addressing the Reliable Stamping Co., Inc., 369 Seventh Street, Buffalo, N. Y.

Many users of the Universal Woodworker, manufactured by the Sidney Tool Company in Sidney, Ohio, find it of special value on account of its compact arrangement. According to figures along this line compiled by the makers it appears that the separate machines would take up on the average about 300 square feet, while when combined as in this woodworker they occupy less than 50 square feet.

Another important economical factor in the operation of the Universal Woodworker is its saving in power. Shop owners using the Woodworker figure it would take about 20 horsepower to operate the machines individually, while only 5 horsepower is necessary to run the Woodworker. Individually the machines also would cost nearly $500, while they can be obtained as combined in the Woodworker for from $200 to $300.

Of course the great value of a woodworking machine is what it earns for its

(*Continued on page 40*)

(*Continued from page 39.*)

purchaser, and many users of Universal Woodworkers testify to turning out a greater variety of work at larger profits. Complete details about the possibilities of this Woodworker can be obtained by writing the manufacturers.

Welding Troubles are problems the blacksmith is always facing. While it is probable that every reader of Our Journal has heard of or used Laffitte Welding Plates, we believe they will be interested in the renewed offer on the part of the makers to send free samples of all Laffitte products.

The Laffitte method of welding was devised in France and thoroughly demonstrated its value there before introduction into this country. It is a chemical process in which the compound in the form of a plate is placed between the metals and hammered in the usual way, producing a perfect homogenous weld. It is said to be particularly valuable in the smithing shop, because it will weld steel that ordinarily can not stand a welding heat.

There are a few cases where the welding plates are not adaptable—such as welding in a hole, cementing a flaw, filling in iron and steel castings—and to meet these requirements the compound is prepared in the form of Laffitte Welding Powder which the makers state works equally well.

Other Laffitte products that the blacksmith will be interested in sampling are: Laffitte Brazing Plates, made in three grades, to cover the entire brazing field; Laffitte Brazing Powder, claimed to be superior to borax, and Laffitte Tempering Powder which is reported to be different from other tempering methods in that the metal is merely raised to a dull redheat and sprinkled with the powder. Liberal samples of these products may be obtained by writing the Phillips-Laffitte Co., Pennsylvania Building, Philadelphia, Pa.

Edwards Shears made by C. D. Edwards of Albert Lea, Minn., and advertised on another page in this issue we understand are giving good satisfaction in thousands of shops in all parts of the world.

These shears are made in two sizes. The No. 5 weighs 200 pounds; cuts 4 x ½ inch soft steel. The No. 10 weighs 430 pounds; cuts 4 x ¾ inch soft steel.

We understand the No. 5 machine is very handy to use; is fastened to the floor by one bolt or a skein-screw allowing it to be swung around in any position. It is cheap in price, although the materials used in its construction are the very best, and every blacksmith, wagonmaker or plowman should investigate this shear before buying any other.

The No. 10 Shear is similar in construction to the No. 5 with the addition of a new pinion and lever combination which give this shear increased power. C. D. Edwards has advised us that either of these shears is on sale by all jobbers. If yours does not have them or if you desire information, circulars will gladly be mailed free on request.

NEW BOOKS.

Questions and Answers Relating to Modern Automobile Design, Construction and Repair by Victor W. Page, M. E.—600 pages—illustrated—bound in cloth—Price, postpaid, $1.50.

This book, arranged in the popular question and answer style, covers nearly 2,000 questions on the automobile. It covers all phases of the self-propelled vehicle from its origin and principles to the most recent of developments. The book pictures such recent devices as the sleeve motor, the self-starters, the electric devices; and practically all of the more modern motor car requirements.

A comprehensive index adds considerably to the value of this book as a ready and handy reference. The novice working at automobile repairing will if he is alive ask many questions on automobile whys and wherefores—this book not only answers them, but makes the answers clear with its many illustrations.

The Modern Gas Tractor—by Victor W. Page, M. E.—480 pages—3 folding plates—204 illustrations—cloth—$2.00.

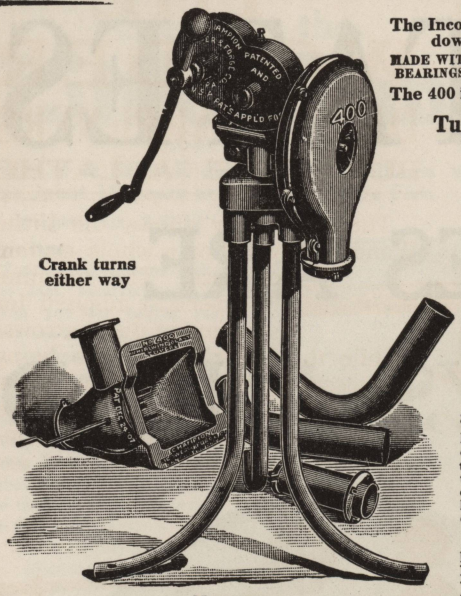
The gas tractor, like the automobile, should come to the shop of the practical general smith when it needs repairs—and the general smith should know all about that gas tractor when he's called on to do the work. We are glad to see, to read and to review this practical book by Mr. Page. It should be in the hands of every smith located in a farming district. It will tell him all about gas tractors. How they operate, how they are constructed and how they are repaired. The book covers practically every style of gas tractor on the market and details the various mechanical features and mechanisms of each. Mr. Page explains all parts of the tractor from the steering wheels to the making of combination hitches. The last chapter contains numerous tables, rules and formulas which should be of great assistance to the tractor repairman. If you are seeking tractor repair business, you will need this book.

Errata — In our review of "Foundry Machinery," on page 49 of the December issue, Spon and Chamberlain were incorrectly announced as the American agents of this book. We desire to correct this error and to say that D. Van Nostrand Company of 25 Park Place, New York City, are sole American agents for "Foundry Machinery." The price of this book is $1.25.

The Incomparable 400 Blower, the one great Heirloom that will be handed down from one generation to the other. Ask what the owners say.

MADE WITH BALL BEARINGS ONLY. **OVER SIX HUNDRED THOUSAND IN USE**

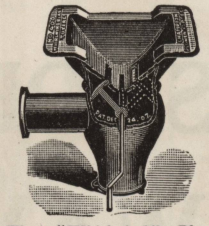
The 400 is the Blower that has Revolutionized the World in making Hand Blast



Crank turns either way

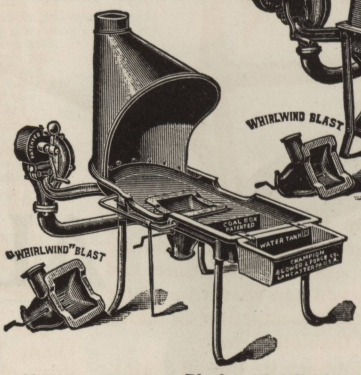
No. 400

Tuyere Iron That Makes a Whirlwind Blast



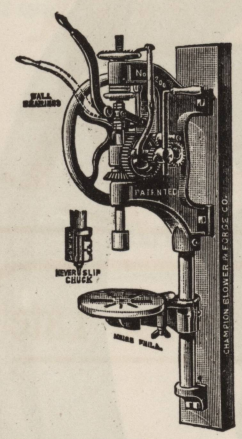
The "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore makes a hotter fire and heats the iron one third quicker; saving much coal.

The No. 400 "Whirlwind" Blast, Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all 400 Blowers WITHOUT EXTRA COST.

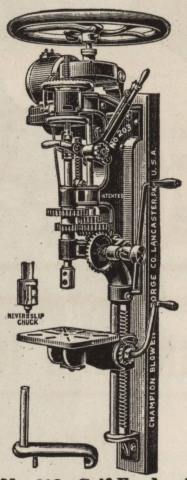


No. 433. Cast Iron Blacksmiths' Forge

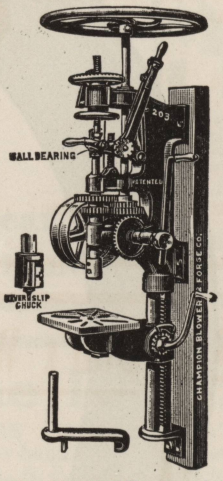
No. 408. Steel Blacksmiths' Forge



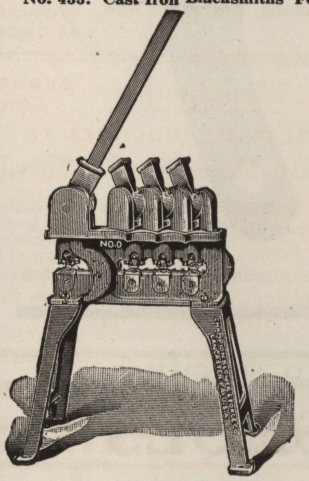
No. 200. Self-Feed and Adjustable Lever Feed Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically-Driven Post Drill.

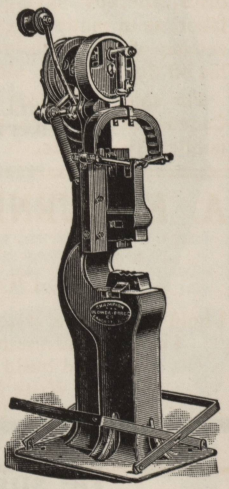


No. 203. Self-Feed and Double Compound Lever Feed Drill.



THE CHAMPION MULTIPLE PUNCH

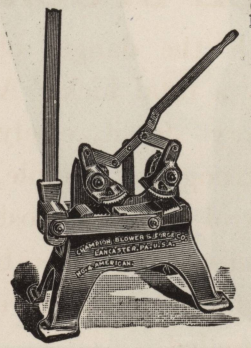
No. 0. Champion Multiple Punch, capacity ¼, 5/16, ⅜ and ½-inch hole in ⅜-inch material.



THE CHAMPION "PATENTED" POWER HAMMER

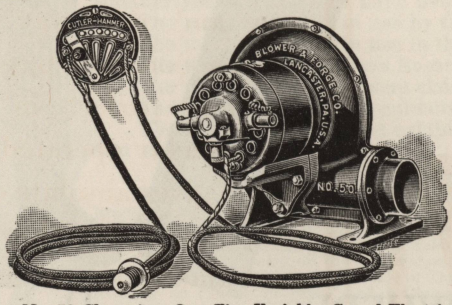
No. 0. Champion Patented Power Hammer with 30-lb. Ram.

No. 1. Champion Patented Power Hammer with 65-lb. Ram.

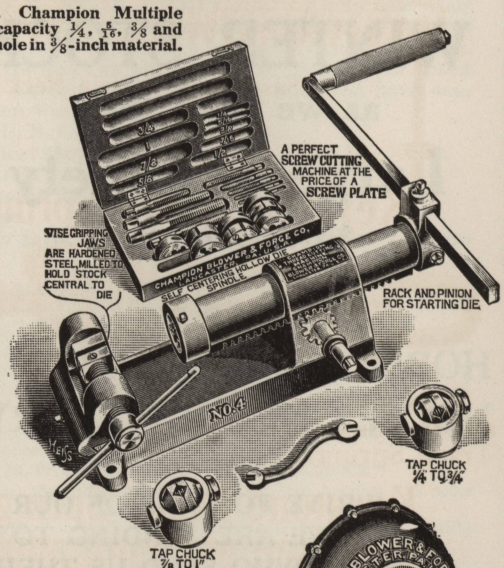


No. 4 AMERICAN TIRE AND AXLE SHRINKER.

Will shrink up to 4x1 inch round edge tire, and axle up to 1 1-4 in.

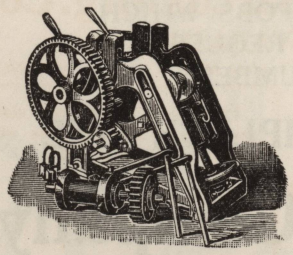


No. 50 Champion One-Fire Variable Speed Electric Blacksmith Blower with a Universal Motor for both Direct and Alternating Current, either 110 or 220 volts, with Detached Rheostat for six speeds, and Steel Pressure Blower Case, for all kinps of general Blacksmith work.



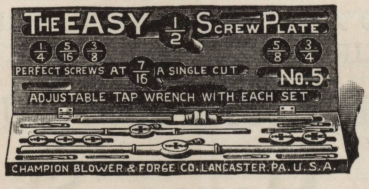
THE CHAMPION THREAD-CUTTING MACHINE

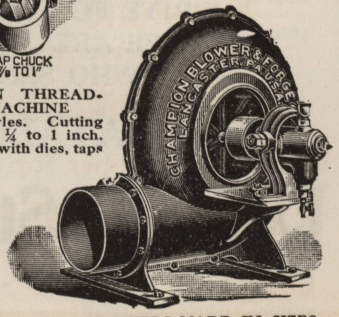
Made in four styles. Cutting from ¼ to ¾, or ¼ to 1 inch. With dies only, or with dies, taps and tap chuck.



THE CHAMPION "COLUMBIAN" TIRE BENDER

Made in three sizes.





SCREW PLATES IN FOUR STYLES, CUTTING UP TO 1 1-2 IN.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.

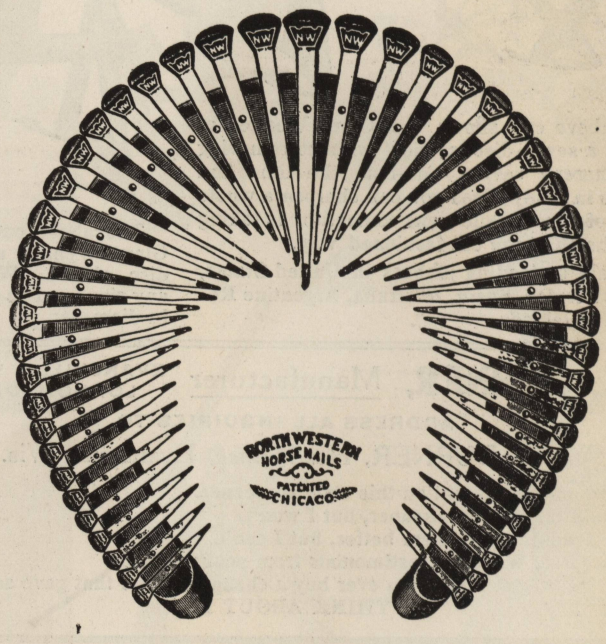
THE CHAMPION BLOWER AND FORGE CO., Lancaster, Pa., U. S. A.

FAN BLOWERS MADE IN SIZES UP TO 64 INCHES IN HEIGHT

NW

FIND "NW" ON THE NAILS YOU USE

THE MARK OF QUALITY



NORTHWESTERN
HORSE NAILS

Are now being used by the great majority of up-to-date Horse Shoers throughout the Country. Once used, you will use no other make — satisfaction to all. For Strength, Safety, and Quality of Material, they have no equal on earth. The Most Perfect in Form and Finish. The Re-enforced Point makes it the Easiest Nail to Drive and the Safest Nail to Use. Will hold a shoe longer than any other Nail on the market. Northwestern Horse Nails are made of the best Swedish Iron and every care is taken in manufacturing them.

TO the thousands of Horseshoers who number among our steady patrons, and likewise to the trade in general, we wish to say that during the year of 1914 the same High Standard of Quality will be maintained in the making of these Nails.

UNION HORSE NAIL COMPANY

SOLE MANUFACTURERS

CHICAGO, ILL.

PORTER'S

"NEW EASY" BOLT CLIPPERS

Are the Standard of Bolt Clipper Excellence. They are made of the best stock, in the most careful manner, by skilled workmen with special machinery tools. All parts are made in duplicate to standard gauges and will always fit. The simple turn of a screw provides ample adjustment (from one thousandth of an inch up), always keeping the cutting edges in contact during the life of the jaws.

Avail Yourself of Experience and Skill

My personal and practical experience in this business is far greater than that of any other manufacturer in the world, and I give my constant hourly attention to the manufacture of my tools. The careful buyer will not, therefore, purchase pattern tools or imitations which are made by "rule of thumb," but will demand

PORTER'S

THE BEST THAT CAN BE MADE

H. K. PORTER

Sole Manufacturer

EVERETT, MASS.